U.S. Fire Administration/Technical Report Series

Wanton Violence at Columbine High School

Littleton, Colorado

USFA-TR-128/April 1999

Homeland Security

U.S. Fire Administration Fire Investigations Program

The U.S. Fire Administration develops reports on selected major fires throughout the country. The fires usually involve multiple deaths or a large loss of property. But the primary criterion for deciding to do a report is whether it will result in significant "lessons learned." In some cases these lessons bring to light new knowledge about fire--the effect of building construction or contents, human behavior in fire, etc. In other cases, the lessons are not new but are serious enough to highlight once again, with yet another fire tragedy report.

The reports are sent to fire magazines and are distributed at National and Regional fire meetings. The International Association of Fire Chiefs assists USFA in disseminating the findings throughout the fire service. On a continuing basis the reports are available on request from USFA; announcements of their availability are published widely in fire journals and newsletters.

This body of work provides detailed information on the nature of the fire problem for policymakers who must decide on allocations of resources between fire and other pressing problems, and within the fire service to improve codes and code enforcement, training, public fire education, building technology, and other related areas.

The Fire Administration, which has no regulatory authority, sends an experienced fire investigator into a community after a major incident only after having conferred with the local fire authorities to insure that USFA's assistance and presence would be supportive and would in no way interfere with any review of the incident they are themselves conducting. The intent is not to arrive during the event or even immediately after, but rather after the dust settles, so that a complete and objective review of all the important aspects of the incident can be made. Local authorities review USFA's report while it is in draft. The USFA investigator or team is available to local authorities should they wish to request technical assistance for their own investigation.

This report and its recommendations were developed by USFA staff and by TriData Corporation, Arlington, Virginia, its staff and consultants, who are under contract to assist the Fire Administration in carrying out the Fire Reports Program.

The U.S. Fire Administration greatly appreciates the cooperation received from the City of Bessemer Fire and Rescue Service. Particular thanks go to Bessemer Fire Marshal Bill Avery and also Alabama State Fire Marshal John S. Robinson.

For additional copies of this report write to the U.S. Fire Administration, National Fire Data Center, 16825 South Seton Avenue, Emmitsburg, Maryland 21727.

Special Report:
Wanton Violence at
Columbine High School

This is Report 128 of the Major Fires Investigation Project conducted by Varley-Campbell and Associates, Inc./TriData Corporation under contract EME-97-CO-0506 to the United States Fire Administration, Federal Emergency Management Agency, and is available from the USFA Web site at www.usfa.dhs.gov

Homeland Security

Department of Homeland Security
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Mission Statement

As an entity of the Department of Homeland Security, the mission of the USFA is to reduce life and economic losses due to fire and related emergencies, through leadership, advocacy, coordination, and support. We serve the Nation independently, in coordination with other Federal agencies, and in partnership with fire protection and emergency service communities. With a commitment to excellence, we provide public education, training, technology, and data initiatives.

Homeland Security

ACKNOWLEDGEMENTS

In an effort to share with others the lessons learned from his department's experience at the Columbine High School tragedy, Chief William Pessemier of the Littleton, Colorado Fire Department requested that the United States Fire Administration (USFA) assist the department in conducting a post-incident analysis of the event and in documenting the fire and emergency medical services response.

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William Pessemier	Chief, Littleton Fire Department
Chuck Burdick	Operations Division Chief, Littleton Fire Department
Jay Ruoff	Training Division Chief, Littleton Fire Department
Doug Ireland	Support Services Division Chief, Littleton Fire Department
Wayne Zygowicz	EMS Division Chief, Littleton Fire Department
Jim Hofstra	Fire Marshal, Littleton Fire Department
Rick Young	Deputy Fire Marshal, Explosives Technician, Littleton Fire Department
Ray Rahne	Battalion Chief, Littleton Fire Department
Gene Nagle	Captain Paramedic, Littleton Fire Department
Susan Brigthmeyer	Paramedic Lieutenant, Action PIO, Littleton Fire Department
Doug Terry	Communications Supervisor, Littleton Fire Department
John Dunaway	Undersheriff, Jefferson County Sheriff's Office
Dave Walcher	Captain, Jefferson County Sheriff's Office
Karen Duffala	Director, Safety and Security, Jefferson County Public Schools
A.J. Heightman	Editor, *Journal of Emergency Medical Services*

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WANTON VIOLENCE AT COLUMBINE HIGH SCHOOL

LITTLETON, COLORADO

BACKGROUND

This report is an analysis of the fire service and emergency medical service (EMS) operations and the overall response to the assault on Columbine High School at Littleton, Colorado, on April 20, 1999. Incident command, special operations, and mass casualty emergency medical services are featured.

In any major incident, the efforts of all public safety personnel are inexorably linked. However, this report does not address the overall law enforcement operations, or the concurrent operations of various police commands, the special weapons and tactics (SWAT) teams, or the explosive ordnance disposal (EOD) units. The Jefferson County Sheriff's Office issued a formal report and has released surveillance video and radio transmissions that provide additional information on law enforcement's efforts during this incident.

For this report, USFA conducted a comprehensive review of internal documentation and interviewed many of the key public safety personnel. Media reports and journal articles also provided insight. Information was gleaned from the timelines of the three dispatch centers: Littleton Police, Littleton Fire/EMS, and Jefferson County Sheriff. These, in turn, were compared and reviewed against the collection of eyewitness accounts and first-responder interviews to capture a reasonable picture of the violent rampage and its impact. Understandably, there are some inconsistencies among the sources of information as to the chronology of events. For this report, the events were reconstructed based on documentation from the primary response agencies.

Near midday on Tuesday, April 20, 1999, the staff and students of Columbine High School in Littleton, Colorado, became targets of yet another U.S. episode of wanton violence. The events of that day shocked the nation as two juvenile offenders carried out a premeditated assault and victimized occupants of the school. Thirteen defenseless individuals were slain, and over 160 students and faculty were triaged – 24 with serious injuries. The two offenders, both Columbine High School students, maniacally unleashed an unprecedented terrorist-style assault using numerous semiautomatic weapons and nearly 100 improvised incendiary and explosive devices. The latter were designed as antipersonnel devices intended to inflict casualties, including harm to responding emergency personnel.

Entering the school building that morning after killing two classmates on the sidewalk, the two students fired their weapons into high-occupancy areas and killed some victims at close range, firing at will, regardless of the victims' cooperation, the ensuing level of police response, or the risk to themselves. During the assault, the two assailants successfully detonated over 30 improvised incendiary and explosive devices, designed to cause numerous casualties. The incendiary devices included glass containers containing homemade "napalm" and various types and sizes of containers holding flammable liquids (gasoline, kerosene, and white gas). The juvenile offenders also deployed variously sized pressurized, flammable gas (propane) cylinders. The explosive devices consisted of pipe bombs of different sizes that were augmented with nails or pellets, or both, duct-taped to the outside

so as to increase the shrapnel yield and the number of casualties. Investigators later located over 60 additional undetonated devices in and around the school.

The offenders also outfitted their own vehicles with incendiary and explosive materials that were deployed as car bombs. These vehicles were discovered in the parking lots adjacent to the school, and were intended as secondary devices to harm people fleeing from the building or to compromise first responders. The perpetrators concluded their rampage by committing suicide.

The Nation has suffered other acts of wanton violence, including previous school shootings. However, this incident was notable because the perpetrators intended the attack to be an act of terror that would devastate their school and the community, thereby earning them personal infamy.

The assault at Columbine High School placed enormous demands on fire, EMS, and law enforcement personnel and placed many of them at mortal risk. Within a short period of time, the incident drew a major response from many agencies to an event that, although relatively short-lived, was extremely complex. The potential for collateral injury or death to emergency responders during the incident was substantial.

The nature of the incident and the resulting response again highlighted the challenges associated with complex, violent incidents and joint command operations. Terrorist-style emergencies place unique demands on public safety providers *and demand nontraditional responses and tactics,* especially in the presence of multiple casualties. The lesson is becoming clear: Public safety managers need to reassess current response strategies in light of emergencies that, with increasing frequency, include wanton violence and demand a coordinated and joint public safety response.

LESSONS LEARNED SUMMARY

This report addresses issues primarily related to the fire service response to this mass casualty incident, including joint command, special operations, and emergency medical services. The key lessons learned from this incident are summarized below. A significantly more comprehensive discussion of these lessons and others is presented in Observations and Lessons Learned, page 32.

- Hostile, multi-hazard situations – including acts of wanton violence – challenge the fire/EMS service to respond with nontraditional tactics and to operate under a unified incident command structure with law enforcement.
- Major incidents draw a substantial number of people and assets to the scene, complicating and compromising access/egress, site safety and security, and mission activities. Anticipating and successfully managing that influx is essential to maintaining command and control of the operational environment. Responding units should be staged outside the incident perimeter and deployed only when specifically "mission assigned". Maintaining unit integrity and individual discipline reduces "freelancing" and promotes personnel and unit accessibility and accountability.
- Terrorist-style assaults compound the unusual risks associated with a major incident. Gunfire, incendiaries, explosives, and secondary devices magnify the risks to responders. There is a great likelihood of mass casualties and of hostage taking, both of which compound tactical response and operations.
- To adequately prepare for complex incidents involving multiple casualties and multiple hazards, public safety organizations should plan their incident command operations within the context of a Regional, emergency management framework.

- Large-scale mutual-aid operations are critically affected by the sophistication and type of communications and information transfer capabilities available to the incident commander and to responding units. Interoperability of equipment and frequencies is essential.
- The wanton violence associated with terrorist-style assaults is intended to inflict both physical and psychological injury, often indiscriminately. During terrorist-style assaults, emergency responders are likely targets, and thus should practice and use exposure and risk reduction strategies as they carry out their emergency assignments.
- High-occupancy public assembly areas are especially vulnerable targets for terrorist-style assaults. Incident preplans for each type of occupancy should be developed or amended to address the potential impact of a terrorist-style assault. Preplans should anticipate the likely response requirements and should be based on joint (fire/EMS/law enforcement) command and operations structures.

DESCRIPTION OF COMMUNITY

Littleton Fire District –Service Area

The Littleton Fire District covers approximately 80 square miles, an area that serves a population of approximately 230,000 residents. The City of Littleton is a suburban community located approximately 10 miles south of Denver in Arapahoe County, Colorado. The Littleton Fire Department's coverage area includes the city proper, with a population of nearly 44,000 covering approximately 11.5 square miles; and an additional 11.75 square miles in Arapahoe County, 44.5 square miles in Douglas County, and 12.25 square miles in Jefferson County. The incident at Columbine High School took place in an area of Jefferson County known as Columbine, which takes its name from the indigenous blue and white State flower. (See Area Response Map, Appendix A).

Littleton Fire Department – Service Profile

The Littleton Volunteer Fire Department (LFD) was established in 1890 and protected the community until 1960, when a full-time, career department was formed. The mission of LFD is to provide emergency response services and life safety education programs that minimize the loss of life and property from fires, medical emergencies, and hazardous conditions. The department provides full-service response and has specialized resources that respond to hazardous materials incident, wildland fires, dive team operations, swift water and ice rescues, and high-angle technical rope rescues. LFD also provides the community with a medical bicycle team and a public fire education team. In 1999, the department responded to 10,280 incidents, 20 percent of which were fire-related emergencies and about 50 percent of which were EMS-related incidents. LFD is experiencing about a 10 percent annual rise in response volume.

The department currently maintains a staff of 143 personnel operating from its headquarters and eight fire stations within its fire district. The eight fire stations compose one battalion, capable of deploying six engine companies, two telesquirt companies, four rescue ambulances, and a hazardous materials company. All units can provide advanced life support services. The on-shift battalion chief supervises the overall operations of the eight fire stations. They are three rotating platoons (A, B, and C), each working 24-hour shifts. Three personnel are assigned to each engine and telesquirt, with a captain supervising each company. The rescue ambulances are each staffed by a firefighter/EMT and a firefighter/paramedic.

The department is organized into five divisions: Emergency Operations, Prevention/Education, Training, Emergency Medical Services, and Support Services, as detailed in Figure 1. The department is staffed according to the profile in Table 1.

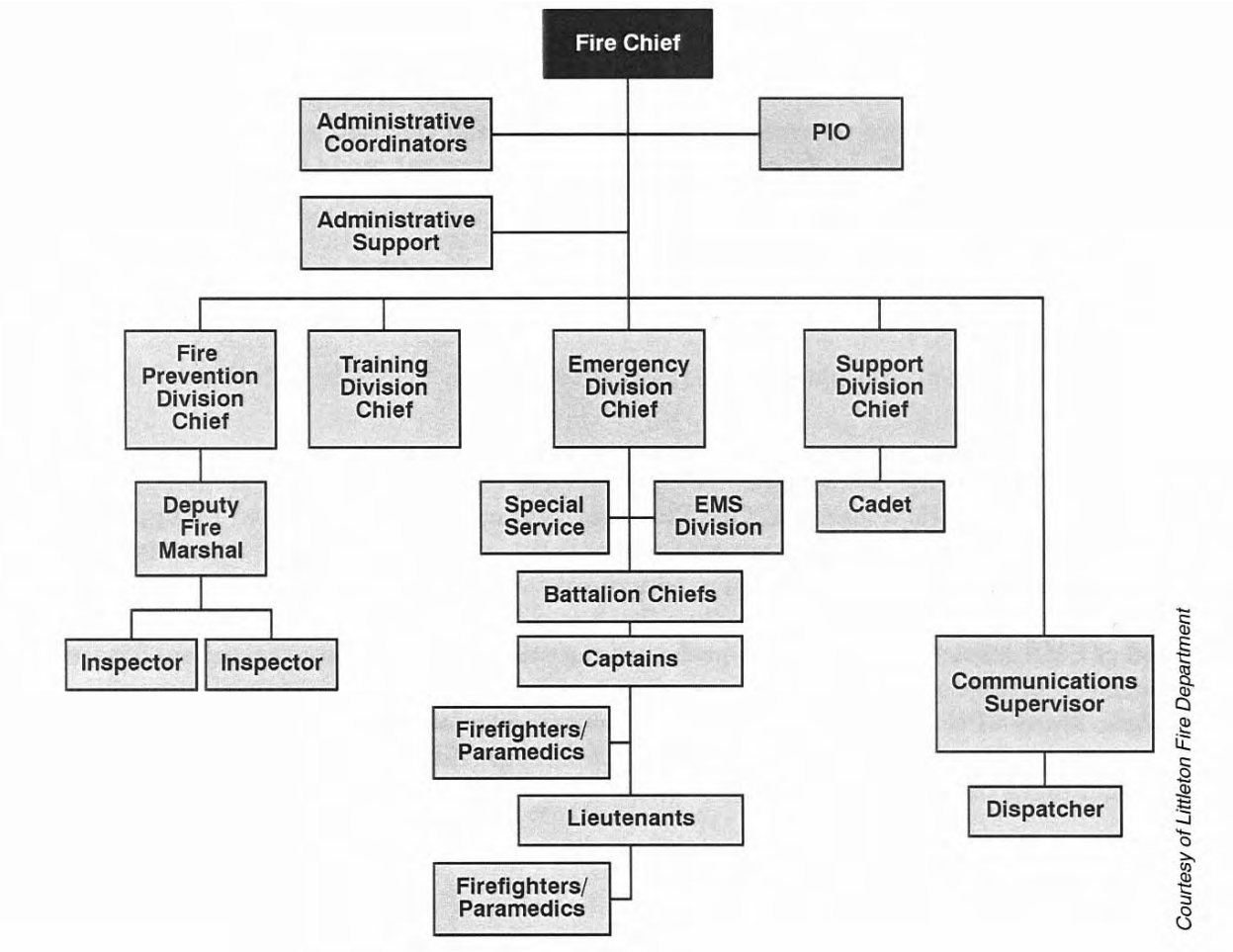


Figure 1. Littleton Fire Department Organization

Table 1. Littleton Fire Department Staffing Profile

Rank	Staffing
Chief	1
Division Chiefs	4
Fire Marshal	1
Deputy Fire Marshal	1
Battalion Chiefs	3
Captains	24
Lieutenants	12
Engineers	24
Inspectors	2
Firefighters	54
Administrative Coordinators	2
Public Information Officer	1
Communications Supervisor	1
Cadet	1
Dispatchers	8
Part-Time Dispatchers	5
Total	144

Emergency Medical Services

In 1974, LFD became the first department in Colorado to deploy fire department-based paramedics. All fire department operations personnel have been certified as at least emergency medical technicians (EMT). In February of 1999, the department made two major changes in their EMS system:

- All units, rescue and fire, are fully equipped with advanced life support (ALS) equipment and staffed by at least one paramedic.
- Critical and urgent-care patients are transported directly to area hospitals by LFD rescue ambulances.

LFD provides emergency "pre-hospital" medical services to the community and its mutual-aid partners. It has recently adopted a "One Plus One" response configuration on all apparatus. One Plus One is deploying one paramedic and at least one EMT on every apparatus, thus expanding EMS coverage to the entire community serviced, at the same time reducing response times of ALS to the scene. One Plus One has proved to be a cost-effective, responsible method of EMS service delivery in the pre-hospital setting. The community also benefits from third-service, private providers who are used primarily for routine and non-emergency patient transfers. Many of these commercial EMS providers assisted directly with site triage and patient transport during the Columbine incident; others provided area coverage to support the mutual-aid units that were drawn to the scene.

Littleton Police Department

The Littleton Police Department (LPD) serves and protects the 11.5 square miles in the City of Littleton by providing patrol, investigations, and support services. LPS has a specialized weapons and tactics team (SWAT). Columbine High school is not typically covered by the Littleton Police, but rather, by the Jefferson County Sheriff's Office.

Littleton Fire and Police Communications

The LFD Dispatch Center is collocated with the LPD Dispatch Center. At the time of the incident, dispatch was on VHF; currently, LFD is on an 800-MHz trunked Regional system. The centers dispatch calls received directly and relayed from the area's respective county sheriff's 9-1-1 dispatch center. LFD communications on one dispatch channel (154.340 MHz); four tactical channels; one Statewide Fire/EMS mutual aid channel, known as the Fire Emergency Radio Network (FERN); and one Statewide dedicated hazardous materials incident channel. Law enforcement agencies within the area each have their own independent radio frequencies. However, there is one Statewide law enforcement mutual-aid channel, the Colorado Law Enforcement Emergency Radio (CLEER).

One dispatch supervisor, 10 dispatchers, and 5 part-time personnel work 8-hour shifts. There are three shifts per day. Two or more dispatch consoles are staffed around the clock. During weekdays there is an overlap position to provide rotation or staff a third console. The dispatchers use a computer-aided dispatch system as well as a medical priority dispatch system (MPDS), which places medical call loads into one of four categories: Levels A and B (for basic life support) and levels C and D (for advanced life support). In 1999, the dispatch center handled approximately 22,000 fire and EMS calls for seven different departments.

During the incident at Columbine High School, most 9-1-1 calls came to the Jefferson County Sheriff's Office Dispatch Center. Both the LFD and the LPD Dispatch Centers handled incoming calls as well. In addition, LFD dispatch handled 47 unrelated fire service and medical incidents during the incident at the high school. From dispatch records, a timeline has been restructured, summarizing the incident events (see Appendix C).

Jefferson County Sheriff's Office

The Jefferson County Sheriff's Office covers an area of approximately 780 square miles and provides primary law enforcement services to a population of approximately 190,000 (out of 500,000 total population in the county), with a staff of 320 sworn officers. The department's headquarters is located in Golden, and its service area is divided into three precincts; northern, southern, and mountain (western). Columbine High School is located in the southern precinct's area of responsibility. A Sheriff's Department resource officer is assigned to each of the high schools in the unincorporated areas of Jefferson County, including Columbine High School.

Jefferson County School District

The Jefferson County School District maintains a contractual ratio of 42 teachers per 1,000 students, which equates to an average classroom size of about 25 students. There are approximately 89,000 students and 5,200 teachers in the school district.

The district has a dress code policy, a drug-free school program, and procedures for locker searches when necessary. Each school has a lock box for emergency response units when the school is closed. Schools are protected by a variety of automatic fire protection and security systems.

Before the incident at Columbine occurred, the school district had begun to work on changing their emergency plan. After considerable effort, a new plan was adopted in the fall of 1999. The plan identifies a wide variety of emergency incidents and describes what faculty and other staff should do in response to each situation. The plan lists who is in charge, whom to contact, what to do, and where to go in the event of various emergencies. Following is a partial list of the situations covered:

- Fire
- Hazardous materials spills/releases
- Student-staff illness, injury, or death
- Blizzard/snow conditions
- Building explosion
- School violence
- Suicide threat
- Bob threat
- Bus accident
- Kidnapping-missing person
- Tornado

Of particular note is the fact that the plan is based on the Incident Command System. In crisis situations, teachers are expected to use their best judgment and common sense. They are familiar with multiple exit points, what to do in a lockdown situation, and where to go depending on the type of incident. They are instructed to follow the procedures taught to them in the emergency management plan.

At the time of the incident, fire emergency dills were the only type of drill commonly practiced. In the elementary schools, the drills occurred once a month (except December). In the middle schools, fire drills were conducted quarterly while the high schools conducted drills semiannually. Administrators and teachers had not had much exposure to other types of crisis training.

Columbine High School

Columbine High School is one of the Jefferson High School District's facilities that is located within the LFD's fire district. At the time of this incident, 1,945 students were registered in the four-grade (9-12), open-campus style high school. Approximately 120 teachers and 20 administrative and support personnel worked at the school.

The majority of the school is a one-story building of masonry construction. However, the facility underwent a substantial expansion several years ago, with a two-story addition that included a cafeteria, library, auditorium, and classrooms.

The area immediately surrounding the school includes several athletic fields, recreational park areas to the north and west, and three parking lots-one each to the northeast, east, and south of the building. A major north/south thoroughfare (South Pierce Street) borders the east side of the school grounds and provides the only street access to the school. Beyond the large parking lot to the south is

an extended privacy fence separating the school grounds from a residential area consisting primarily of one- and two- story single-family homes.

At the time of the incident, the school had a public address system in the administration office with speakers in the hallways, auditorium, gymnasium, classrooms, commons area, and cafeteria. There were security cameras in the administration area and the cafeteria. Each of the 75 classrooms had televisions, computers, lockable doors, and a telephone. The telephone system provided 20 outside lines.

The building's installed fire protection system included an AC/DC power supply battery backup alarm system, fire alarm annunciator panel, sprinkler zone control panel, manual pull stations, water gong sprinkler flow alarm, and fire department supply inlet connections for the sprinkler system. The sprinkler heads throughout the majority of the school are rated to activate at either 135 degrees Fahrenheit or 165 degrees Fahrenheit. The capacity of the system was originally designed to accommodate the simultaneous activation of eight heads before the fire department needed to supplement the sprinkler system water supply. However, when the addition was constructed, the capacity was reduced to six activated heads.

THE DIVERSION

On April 20, 1999, at approximately 1122 hours, the Littleton Fire Department, West Metro Fire Department, and Jefferson County Sheriff's Office patrol deputy were dispatched to a reported explosion and grass fire at the intersection of Chatfield and Wadsworth, approximately 3 miles southwest of Columbine High School. A road crew working along the road's shoulder noticed two bags and tossed them aside. One bag exploded, resulting in a small brush fire. A crew member called the 9-1-1 operator, who dispatched the Littleton Fire Department. Engine 13, normally the unit closest to Columbine High, was sent to investigate the explosion and to extinguish the resulting brush fire. The person reporting the incident stated:

> I don't know if it was a car or what it was, but they're on Wadsworth North Boulevard between Chatfield and Ken Caryl. There was an explosion in the backyard. I don't know if it was a car or a propane tank, a big ball of fire, now there is smoke. There are several people pulled off to the side of the road.

Upon arriving at the scene, they found a small grass fire and an explosive device that had detonated. The deployment of Engine 13 on this call placed them about three times farther away from the high school than would have been the case if they had been in station. Figure 2 shows the locations of Columbine High School, Fire Station 13, and the diversionary device.

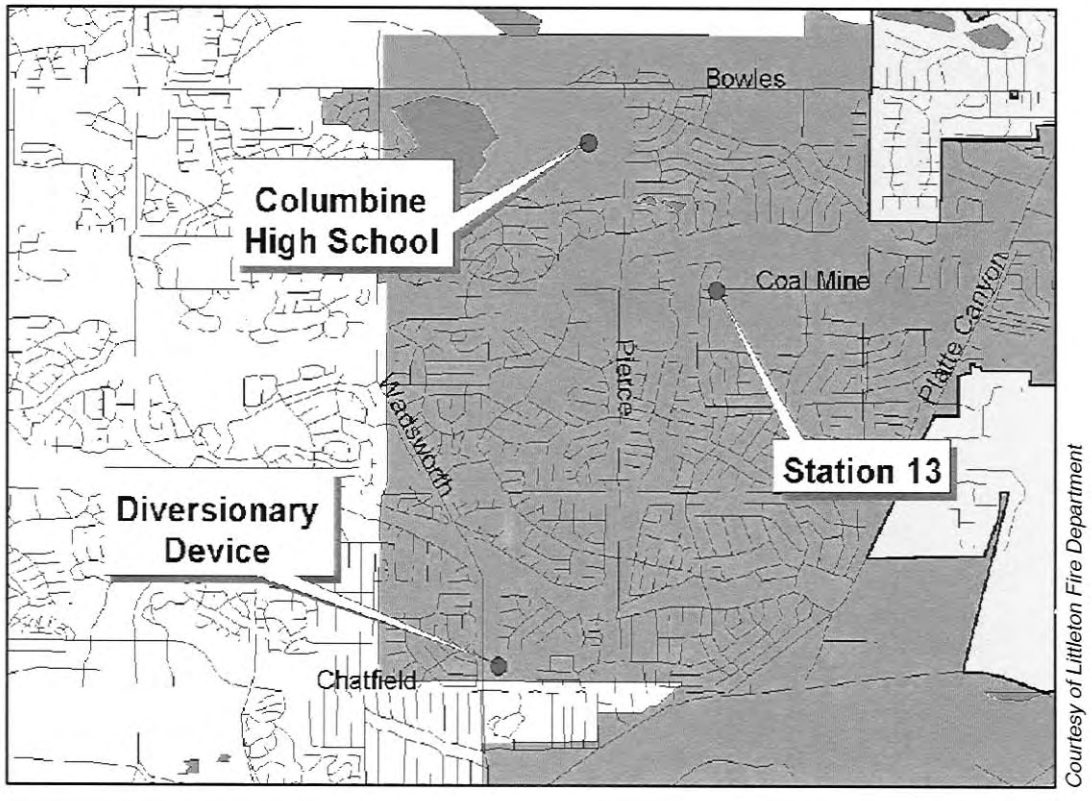


Figure 2. Location of Diversionary Device in Relationship to Station 13 and Columbine High School.

THE ATTACK

The assault on Columbine High School began when two male students, ages 16 and 17, arrived at the school, parked their cars, and carried two duffle bags into the cafeteria. They returned to their cars, put on their trench coats, and gathered their weapons. They open fired at students sitting by the fence and outside the cafeteria on the grass by the west entry doors, killing two and injuring five. Shortly before 1200 hours, the perpetrators lofted at least one explosive device onto the roof. They then went to the northwest doors of the west corridor entrances outside the library (see Figure 3).

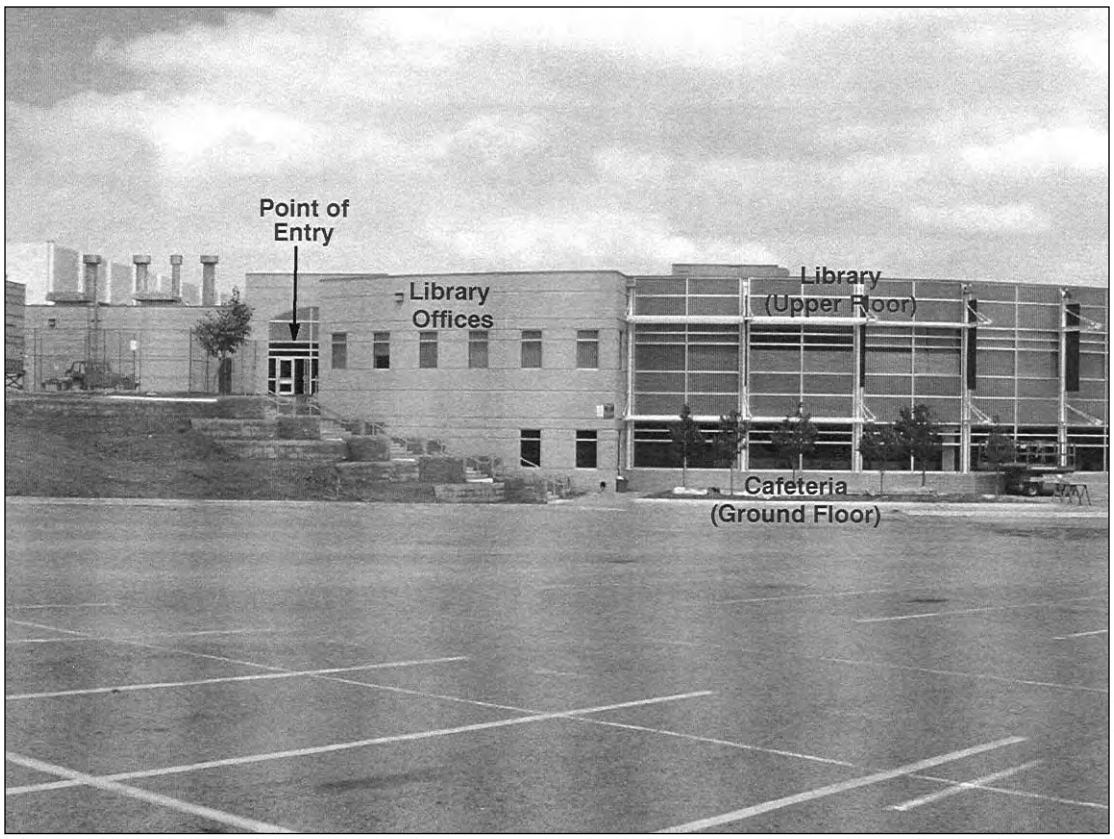


Figure 3. Columbine High School Facing Ground-Level Cafeteria, Point of Entry, and Second-Level Library

As the attack began, some students thought it might be something related to Senior Prank Day involving firecrackers. A major segment of the students and faculty were completely unaware of the events that were unfolding. However, it quickly became apparent that a violent incident was occurring. Teachers who could not get their students out of the building locked down their classrooms and barricaded the doors in an effort to keep the students safe. Other students were ushered out of the building to safety by the faculty and by fellow students. The administrators were able to relocate to safe refuge areas and began efforts to track the locations of students and faculty. The principal and a representative from the school district coordinated efforts to provide parents and the community with information as it became available.

The attackers threw pipe bombs, fired inside the school doors, and then entered through the west entry doors. Shots were fired down the hallway at fleeing students. The two heavily armed students

exchanged gunfire with the school resource officer and continued throughout the school, shooting and throwing bombs. The assailants entered the library and walked through the area for approximately 10 minutes, encountering students who were hiding under the tables. Ten students were fatally shot, 11 were injured, and other escaped unharmed. The assailants then proceeded downstairs to the cafeteria, shown in Figure 4, and partially detonated one of the initially deployed duffle-bag bombs. From there they proceeded into the science area, shooting through doorway glass panels, deploying additional pipe bombs, and starting a fire. They then returned to the library and opened fire to the outside, shooting at paramedics who were attempting to rescue the victims lying outside the cafeteria.

Courtesy of Littleton Fire Department

Figure 4. Cafeteria of Columbine High School after April 20th. Arrows indicate the melted plastic chairs and lighting cover over the area of incipient fire.

Because of the haphazard path that was taken by the attackers, there were numerous 9-1-1 calls from different locations inside the school, further adding to the confusion as to the location and number of perpetrators. At one point, law enforcement personnel were under the impression that as many as eight individuals may have taken over the school.

Post-incident reconstruction suggests that the two perpetrators committed suicide in the library shortly after firing at the paramedics at about 1205 hours. This fact, however, was not known to first responders at the time. As a result, law enforcement and fire/EMS resources continued to arrive at the scene and to operate on the premise that violent perpetrators still posed a danger to students, faculty, and public safety personnel.

THE RESPONSE

The Jefferson County Sheriff's Office 9-1-1 operators began receiving a flood of phone calls from panicked students and faculty. The activated fire alarm at the school also alerted the operators to a situation at the school. A teacher called 9-1-1 from the library to report that the teenage assailants were approaching and that she was desperately trying to keep the students under the tables. The 9-1-1 tape reveals her beseeching the children to find cover and stay down.

Littleton Engine 11, Rescues 11 and 13, and Battalion Chief 1 were dispatched for a report of shots fired and an explosion on the initial response to the school at 1129 hours. It is estimated that gunfire was exchanged between the assailants and the school resource officer at the same time.

At 1133 hours, while enroute to the school, Rescue 13 requested that two ambulances be added to the assignment while Engine 11 requested that a MedEvac helicopter be placed on standby. By 1137 hours, Rescue 13 had arrived and staged at Weaver and Pierce Streets.

Littleton's Battalion Chief 1 arrived on the scene at 1138 hours and assumed fire command at Pierce and Fair Streets (see Figure 5). He immediately gave a size up of the situation and designated a staging area for Rescue 13 at Pierce and Weaver. He then requested that a law enforcement representative respond to the command post as a massive law enforcement response was developing. Engine and Rescue 11 were directed to stage at Pierce and Leawood.

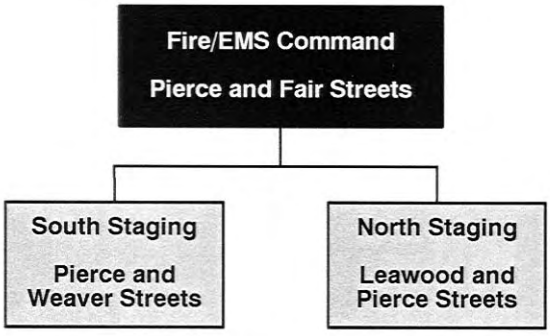


Figure 5. Initial Command Structure (about 1135 hours)

It is difficult to imagine the scene that first responders encountered shortly after arrival that morning. What they were confronted with was confusion, carnage, and chaos – the result of indiscriminate, wanton violence. The scene included the following.

- Dead and injured students and faculty who had been shot with a variety of semiautomatic and conventional weapons
- An active, hostile environment
- Antipersonnel-style, improvised explosive devices (IEDs) in various locations of the two-story portion of the south end of the school, and extending into the adjacent lawns and sidewalks, which suggested additional risks, such as booby traps, tripwires, and motion-sensitive detonators

- Incendiary devices fueled by flammable liquids and gases in various types and sizes of containers
- An unknown number, status, and circumstance of school occupants hiding inside the structure in many locations, such as above drop ceilings, in closets, and in classrooms
- Confirmed casualties needing medical assistance both inside and outside the school
- Violent perpetrators whose numbers, identity, location, and status were unknown
- Terror-stricken occupants running from building and hiding behind vehicles and barriers
- An activated sprinkler system
- An activated fire alarm
- Reports of an odor of natural gas
- The interior environment compromised by smoke, haze, noise, and flashing strobes from the fire alarm system.

Battalion 1 was receiving information from students, teachers, and law enforcement personnel already on the scene. The Jefferson County Sheriff's Office reported to the LFD dispatch center that students were congregating at several locations. Due to the large number of students and teachers fleeing the scene in various directions, multiple triage and treatment areas would be established. The initial triage/treatment area was organized in Clement Park, just north of the school grounds.

At 1141 hours, the Engine 11 captain worked with students to control the crowd and to identify which students had seen the offenders and might be able to provide information. He directed all Littleton Fire Department personnel to remove their blue uniform shirt and badge, reverting to the standard issue gray fire department T-shirts to enable on-scene personnel and panicked students to more easily differentiate between the police and fire and EMS personnel.

The fire department dispatch center had broadcast warnings that he suspects might be wearing long, black trench coats. The center also had received reports of victims with head, face, and spinal injuries, at various locations in and around the building.

At 1144 hours, after recognizing the impending complexity of the incident, Battalion Chief 1 requested assistance from the Jefferson County Sheriff's Office to set up a unified command post. Simultaneously, Rescue 11 was deployed to Fair and Pierce Streets for a victim with a gun-shot wound to the leg. Rescue 11 transported this patient to Jay and Bowles Streets, where the patient was transferred to Columbine Ambulance 5 and transported to Littleton Hospital.

At 1145 hours, there was a report of at least one assailant located in the cafeteria.

At 1146 hours, the command post was relocated to Leawood and Pierce near the Sheriff's command post by Chief 10, the designated operations chief. He also initiated a callout of senior fire officials. The Littleton Fire Chief, Chief 1, was placed on the call at 1150 hours and responded from headquarters.

In the school cafeteria, the assailants were trying to activate homemade explosive devices that had not detonated by shooting at them. Their actions were captures by surveillance camera tapes that show the two teenagers entering the cafeteria, throwing devices, and shooting at one of the *predeployed*

devise until it ignited and activated the school's sprinkler system at 1152 hours. That device consisted of a 20-pound propane cylinder, a 1-gallon metal can of flammable liquid, and a 1-gallon container holding flammable liquid. The detonator was made of a pipe bomb with a combined mechanical and electrical activator. The propane cylinder was not breached and the container did not vent in the ensuring incipient fire. Only the flammable liquid in the 1-gallon metal can ignited.

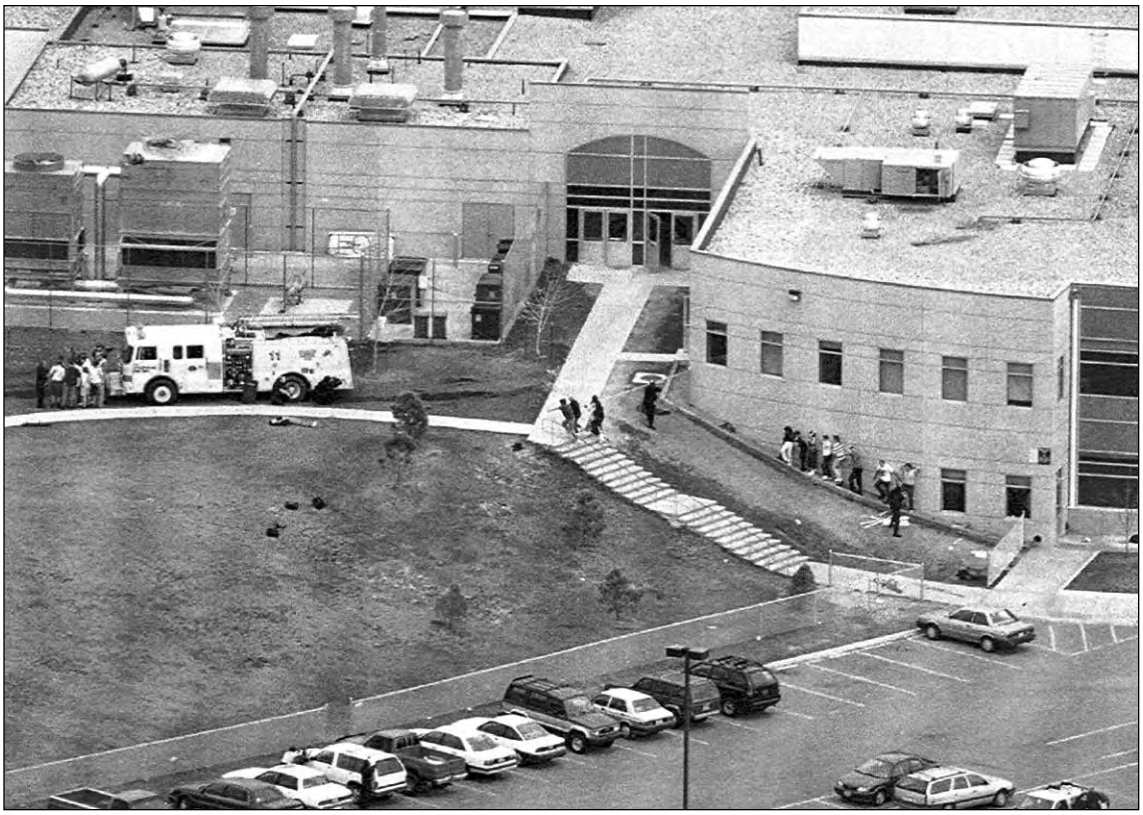
Chief 1, along with the deputy fire marshal and a paramedic captain, arrived on the scene at about 1159 hours, assumed command of the fire and EMS operations, and established unified command with the Jefferson County Sheriff's lieutenant in charge. The arriving command officers obtained information on the situation and resource status, incident objectives, and operational tactics. Battalion 1, now the designated operations sector chief, divided staging into fire and EMS. The north staging area included mostly law enforcement and EMS, while fire and EMS units staged to the south (Figure 6). A liaison officer was established due to the numerous resources and agencies responding to the scene. The Fire Department's Public Information Officer (PIO) assisted the Sheriff's Department (PIO).

Courtesy of Corbis Sygma

Figure 6. Ambulance Staging at Columbine High School During Incident

As the incident progressed, two paramedic units moved in to rescue students who were just outside the building. Two minutes later, at 1158 hours, Rescues 11 and 13 reported that they were "taking gunfire" as assailants shot at the EMS and law enforcement personnel. Despite facing lethal gunfire, the unarmed paramedics made repeated attempts to rescue the wounded and take them to safety. Disregarding their own safety, drivers of the rescue units positioned the vehicles to protect the patient loading area from the line of fire. They successfully rescued three critically injured students, and confirmed that a fourth student was dead.

At 1202 hours, while Rescues 11 and 13 had recovered three victims and were withdrawing under fire from the southwest parking lot, fire command authorized the police to use Engine 11 as a vehicle shield for the SWAT officers positioned to approach and enter the school. The windows of the engine were covered with body armor, a SWAT officer received an impromptu course in driving the fire apparatus from Engine 11's driver, and all the medical equipment was pulled off the engine for use elsewhere on the scene. Onboard breathing apparatus were left on the engine. Those assets should have been removed in order to secure them and to reduce projectile-induced explosion risks to personnel and equipment. Engine 11 crew members were subsequently assigned to assist Rescue 11, Rescue 13, and the medical sector. Figure 7 shows the position of Engine 11 during these operations.



Courtesy of Corbis Sygma

Figure 7. Position of Littleton Engine 11 During SWAT and Rescue Operations

Over the following 35 to 40 minutes, command designated a medical group with a communications officer and a transportation officer (Figure 8). Although a precise time was not available, Jefferson County activated an EOC in their county building in Golden while also establishing an information and media center at the Columbine Public Library, which was also used as a meeting location for students and parents, as was Leawood Elementary. Student names were faxed back and forth between the library and the elementary school as information was updated. Mutual-aid companies began backfilling the Littleton fire stations.

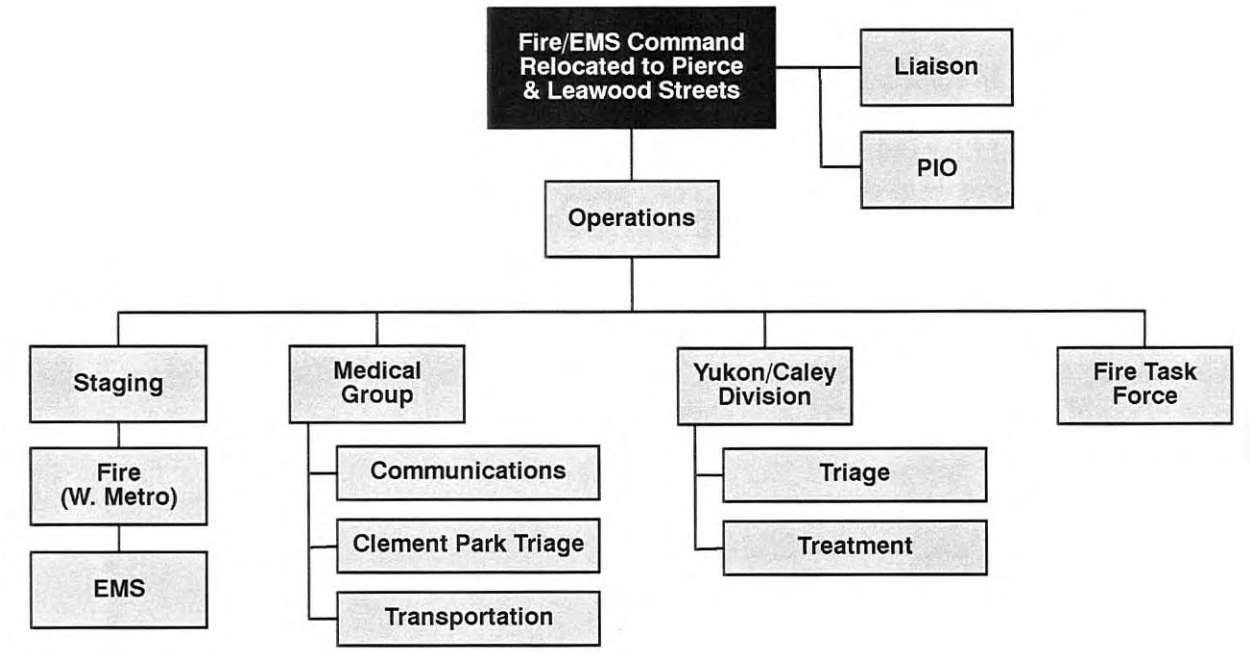


Figure 8. Second Command Structure Evolution (Established between 1142 and 1210 hours)

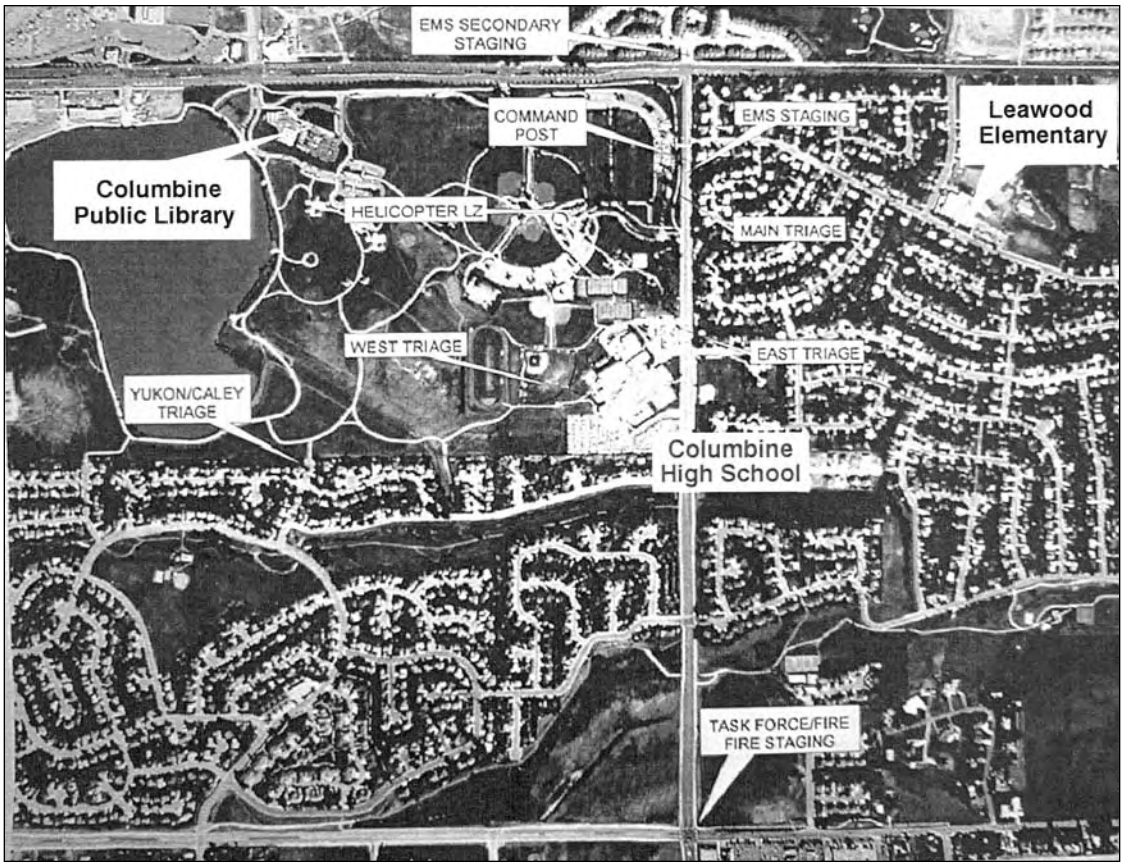
Rescue 13 transferred one of its two patients to a waiting Denver Health Ambulance, which subsequently transported the patient to Denver General Hospital. Rescues 11 and 13 each transported their patients to the Swedish Medical Center. Students – some wounded – were being escorted from the school and away from the area by law enforcement personnel.

A landing zone was established for medical helicopters on the soccer field of nearby Clement Park (Figure 9). The area was chosen because it was out of the line of sight from the building and could accommodate two helicopters at a time. The area was easy to secure, had good access to the street, and provided adequate space to stage and prepare a potentially large number of patients for MedEvac transport.

At 1210 hours, the lieutenant from Rescue 18 established the Yukon/Caley Triage Division, a cul-de-sac in the residential area south of the school where students, some of whom were injured, began congregating. Communications at the site were limited as the area was essentially a "dead zone." The communication problems experienced at Yukon and Caley prevented the lieutenant from contacting the triage sector for hospital assignments via the trauma-net hospital radio link.

Law enforcement officers began transporting some of the injured students in their police cruisers from a refuge area on the northwest corner of the school to the cul-de-sac at the intersection of Yukon and Caley. Rescue 18 responded first to the new triage area with five personnel. Rescue 18 had been transporting the crew from another unit that was placed out of service for mechanical reasons. Included on Rescue 18's crew were two paramedics, two EMTs and a new dispatcher assigned to ride in the ambulance to observe field operations. An ambulance and engine company

from the West Metro Fire Department also responded to Yukon and Caley from a staging location at the Littleton/West Metro fire district border. (Figure 10). Staffing was further augmented when an off-duty LFD paramedic captain, who was on his way to the school to locate his daughter, arrived and began assisting with patient care. Many of the law enforcement and fire department personnel at the scene had children or knew other teens that attended Columbine High School, which added significantly to responder stress levels.



Courtesy of Littleton Fire Department

Figure 9. Aerial View Showing Locations of Pertinent Sites and Areas During the Columbine Disaster

Littleton's Training Chief, Training 10, was in charge of coordinating the landing zone for the MedEvac helicopter east of Clement Park. Training 10 had been involved with live burn training evolutions prior to responding to the emergency at Columbine; he was still wearing his soot-covered turnout gear. At 1212 hours a police sniper deployed about a quarter mile away observed Training 10 and considered him a suspicious person because he appeared to be wearing a black trench coat. The chief was not wearing a helmet or an incident command vest, which would have more readily conveyed his operational role. Command vests were not used because the battalion chief's vehicle was out of service briefly for an oil change. All the normally available incident command equipment was left in the vehicle, and the reserve vehicle was not comparably equipped. Officers attempting to secure the area approached Training 10 with their weapons drawn and took him to the ground before realizing who he was.

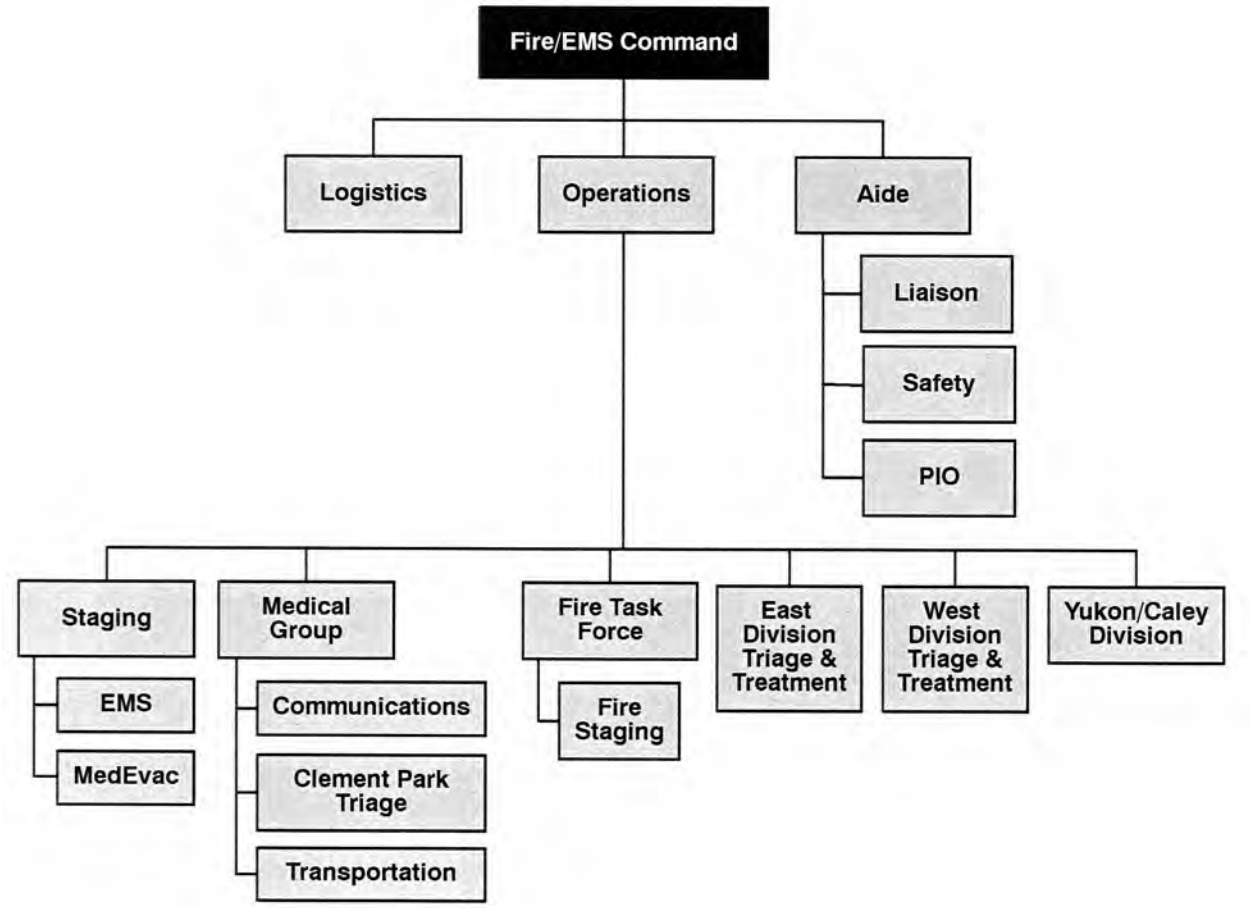


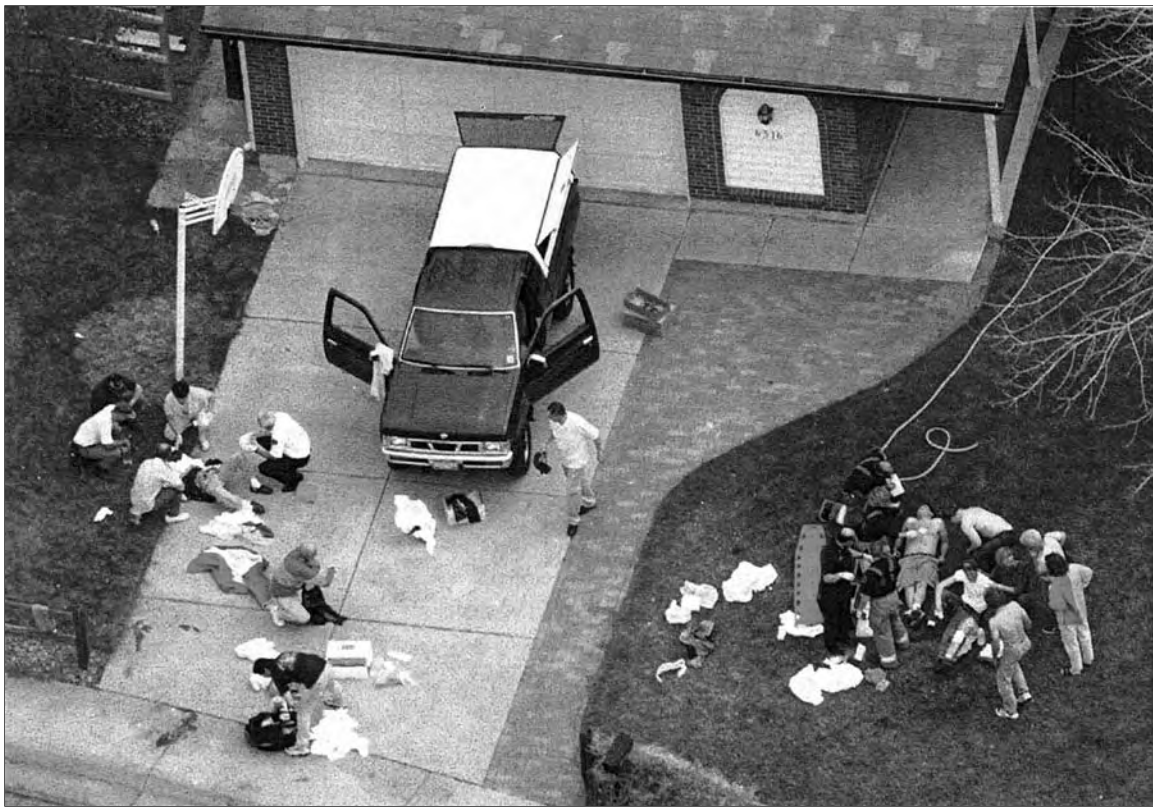
Figure 10. Third Command Structure Evolution (Established between 1200 and 1238 hours)

At 1218 hours Yukon and Caley Command (R-18) requested 10 ambulances to assist with 11 patients – 4 critical, 4 serious and 3 stable – all of whom were students. One of the patients, a young male with a gunshot wound to the head, began to experience seizures just prior to transport; paramedics rushed to airlift this patient to the hospital (Figure 11). Other units that assisted at the Yukon and Caley Triage Sector (Figure 12) included Engine 13; West Metro Ambulances 10,12, and 13; Pride Mark Ambulance 106; and Rescue 101. At 1224 hours Regional hospitals set up a trauma network and conducted an available bed count of their respective facilities.

Situation report from SWAT members inside the school indicated that fire suppression resources might be needed. Reports indicated that there was a fire in the cafeteria and activated sprinkles. In addition, the odor of what was thought to be natural gas was present in the school, creating concern over the potential for explosion and fire. Later, it was determined that the smell was in fact the residual odor of the combustible liquids ignited from the propane bombs in the cafeteria. A fire task force was established at 1242 hours and staged at Pierce and Coal Mine Streets. The task force was made up of apparatus and personnel from the Littleton, Denver and West Metro Fire Departments. It was determined that the best access to the building would be through the main entrance. The task force began formulating plans to combat a fire-related emergency, working closely with law enforcement personnel.

Courtesy of Corbis Sygma

Figure 11. Medics Transporting an Injured Student from Columbine High School



Courtesy of Corbis Sygma

Figure 12. Yukon and Caley Triage Sector. Eleven injured students were treated and transported in less than 1 hour.

With communication between fire and rescue personnel increasingly hampered due to the sheer volume of radio traffic, the fire department incident commander, Chief 1, requested a second fire ground channel, a dispatcher from the emergency communication center, and the expedient deployment of the department's new 800-MHz radios, which had not yet been placed in service. The radios arrived and were selectively deployed to link the different sectors of the ICS, while the use of VHF radios continued for the fire task force and staging operations. Concurrently, all EMS units with access to the Fire Emergency Response Network (FERN) were switched over to that channel. The channel allowed most, but not all, mutual-aid companies and the Littleton Fire Department EMS units to operate on the same frequency. Also, all ambulances transporting patients were required to notify the facility to which they were responding on the Hospital Emergency Administrative Radio (HEAR) network, which links all the area hospitals.

Shortly before 1300 hours, parents were advised that uninjured students could be met and released at Leawood Elementary School. Frantic parents descended upon the school in anticipation of meeting up with their children. At 1354 hours, LFD's Rescue 18 and Engine 17 were called to Leawood Elementary for a reported heart attack.

At 1305 hours, just 90 minutes into the incident and only 1 hour after it had been established, the Yukon and Caley Triage Sector reported to command that all 11 of their serious patients had been transported to local hospitals. Police officers accompanied each patient to the hospital to provide protection, to collect additional intelligence and evidence, and to be available to record dying declarations if necessary. One ambulance called dispatch while transporting victims to the hospital and indicated that they were possibly being followed by one of the assailants. Returning ambulances restocked their medical supplies at Station 13 and awaited further mission assignments.

Rescue 13 was ordered to locate at the east doors of the school at the request of SWAT officers, who told them to wait there while they attempted to reach a critical patient inside the building. The plan was to have the SWAT team bring the patient out to the rescue, since it was unsafe for the paramedics to enter the building. At 1325 hours, Rescue 13 established the East Triage Sector at the east entrance of the school. The purpose of this sector was to triage and treat faculty and students as the SWAT team removed them from the building, or as they escaped on their own. Members of Rescue 13 also found a suspicious backpack in their path in the east entrance; by this time they had been warned about the possibility of motion-sensitive detonators. There were reports that the gunmen may have changed clothes and were attempting to escape with the other students. Thus, as students evacuated the building, Jefferson County Sheriff's Department personnel ordered that they all be treated as suspects until cleared. Throughout the incident, numerous students and faculty were evacuated from various locations inside the school.

Littleton fire officials, Engine 17, Rescue 18, and the bomb squad were dispatched at 1429 hours to one of the suspect's home for a report of a natural gas leak. Upon arrival and investigation, the crews found a variety of apparently live explosive devices. The engine company established a water supply, and all radio transmission on the scene were suspended. Upon arrival of an LFD captain at 1525 hours, the surrounding homes were evacuated, and the bob technicians proceeded to render the devices safe without incident.

At the school, units were still operating with extreme caution. They were unsure of the suspects' locations or conditions and were concerned about the obvious presence of explosive and incendiary devices. With students still in the building and no information about the status of most of them, the West Triage Sector was established at 1457 hours. An LFD captain assumed command of the sector and used the mutual-aid crews and equipment from Denver Health, West Metro, South Metro Rescue, and other ambulance companies. The primary mission of this sector was to support SWAT operations and to triage and treat victims who might exit the west side of the building.

By 1534 hours, there were reports of more than 20 people injured in the school. Additional reports indicated that there were three officers and two suspects down within the school. Although the "officer down" reports proved to be unfounded, they added substantially to the tension at the scene. Also at this time, area emergency service personnel began responding. A local news crew had aired an unauthorized and unneeded request that all available EMS personnel in the vicinity of Littleton should go to Columbine High School to assist with the mass casualty incident. The responsiveness of these personnel, some of who drove as long as 2 hours to reach the scene, is commendable, but the influx of unnecessary providers only added to the onsite challenges.

By approximately 1537 hours the last surviving student from the library was transported with multiple gunshot wounds. Moments later, at 1540 hours, a teacher with a gunshot wound to the shoulder was transported. These actions essentially drew the assault-related EMS operations to a close.

Due to the duration of the incident, a logistics sector officer was established. The American Red Cross and the Salvation Army supplied food for the emergency workers at the scene. Sanitation needs were addressed, and potable water was provided. Local merchants helped with food and beverages. Emergency cellular telephone communications were enhanced at the incident site by deploying portable towers to improve service. Lighting units were requested to support nighttime operations. Fuel tenders were provided to refuel equipment. The Littleton Fire Department also provided a mobile mechanic and tow service for a mutual-aid that had broken down.

Although a formal planning sector was not established at this incident, the resources that were requested were tracked. Patient tracking was conducted between the treatment control officers, staging, and the transportation control officer. (See Appendix B for the Unified Incident Command Chart).

At 1543 hours the incident command post received a report of a possible gas leak in the ceramics room of the school. Not long after, the SWAT officers reported that there were no more survivors in the school. The Fire Task Force was then asked to assist the EOD teams who were conducting render-safe operations. The task force's assignment was to provide medical assistance and fire suppression if a device activated. Every member assigned to the Fire Task Force operations volunteered for this hazardous assignment.

The Fire Task Force was also requested to shut down the sprinkler system, deactivate the fire alarm system, and shut off the natural gas supply to the school. Gas company personnel assisted in these operations. As the fire department personnel and the utility workers approached the rear of the building to shut off the gas supply, they received reports of shots fired in the gymnasium. Actually, one of the explosive devices had detonated spontaneously, but there was no fire and no one was injured.

By 1600 hours fire/EMS operations had undergone transition to a standby status in support of ongoing EOD and law enforcement activities. At 1604 hours SWAT officers cleared fire department personnel to enter the building and shut off the school's fire alarm and main sprinkler system. As the incident began to wind down for the responding firefighters and paramedics, the Littleton Fire Chief ordered that all B-shift personnel be brought in to relieve the A-shift personnel for the remainder of their shift, thus allowing the A-shift personnel to stand down.

Despite the de-escalation, danger still existed within the school. Many explosive and incendiary devices remained in place, and hundreds of backpacks that had to be checked for explosives were still inside the building. Explosive experts and SWAT officers were particularly concerned about the possibility that the assailants had placed motion-sensitive detonators on devices throughout the school, or hidden devices in concealed locations.

A physician from Denver Health was on the scene as a medical control officer to coordinate transportation of the victims to area hospitals. The command staff was in the process of establishing a team of firefighters/paramedics to go into the building to verify the fatalities. Volunteers were requested, and protective equipment, such as helmets and ballistic vests, were being gathered. AT 1645 hours, the physician entered the school – against orders from the law and fire commands – to pronounce the dead. The physician, on his own initiative, assembled a team of on-scene paramedics to search the school with him. Their personal safety, as well as that of all emergency responders who were still on the scene, was jeopardized by these actions. One of the medics whom the physician directed to assist him went on short-term disability leave after the incident due to post-traumatic stress.

Most of the LFD personnel returned to their stations by approximately 1700 hours Critical incident stress debriefings took place that evening at the fire stations, and continued incrementally for months. Most A-shift personnel were relieved by 2000 hours. Meanwhile, bomb technicians from different agencies worked into the evening at the school, performing render-safe procedures on various devices that were being removed. At 2230 hours one technician accidentally detonated a device while loading it into a disposal unit and had to be evaluated for injuries. That event effectively suspended operations for the day. The bodies of the deceased were removed the following afternoon, which concluded the direct fire and EMS support. Investigators processed the crime scene and maintained custody of the school until it was returned to the school district on June 1, nearly 6 weeks after the incident. The response sequence is outlined in its entirety in Appendix C, Incident Time Line.

Law Enforcement/SWAT/EOD

The first law enforcement actions were rendered by the Jefferson County Sheriff's Office community resource officer who was assigned to the high school. He was able to identify the initial location of the suspects and to communicate their actions to incoming personnel.

Upon arrival, the incident commander representing the Jefferson County Sheriff's Office recognized the need to collocate command posts and to unify the command structure with the fire department. It was especially helpful to place both command posts together because inter-agency communications were challenging, even under "normal" circumstances.

Law enforcement was able to establish a Tactical Operation Branch to coordinate the interior SWAT operations as well as the tactical snipers who were deployed around the perimeter. An Evacuation Branch was established to control the triage/treatment areas, conduct interviews with students and teachers who had information pertaining to the incident, and transport the non injured students to safe refuge area. The Evacuation Branch also assisted the parents at the Leawood Elementary School until they were reunited with their children. The Scene Control Branch established inner and outer perimeters, monitored staging areas, and provided victim assistance and parental control. The Investigations Branch (Figure 13) conducted the crime scene investigation, including explosives and munitions; gathered information and intelligence; worded with the coroners office and conducted vehicle, scene, and residential searches and seizures, shows how the law enforcement response was organized. Figure 14 shows how the law enforcement response was organized.

The SWAT teams at first were assembled by assigning SWAT personnel regardless of what agency they represented. A total of four primary SWAT teams were deployed (Figure 15). Five secondary teams were organized to perform secondary searches. When the teams' officers entered the building, they discovered detonated and unexploded devices, an activated sprinkler system, and activated smoke and fire alarms. The SWAT personnel began a search of the 75 classrooms, restrooms, closets, utility rooms, and connected areas. They found students who were hiding in concealed spaces throughout the building. The officers searched each room, cleared it, marked their findings on the door, and then communicated the information to the Tactical Operations Branch director.

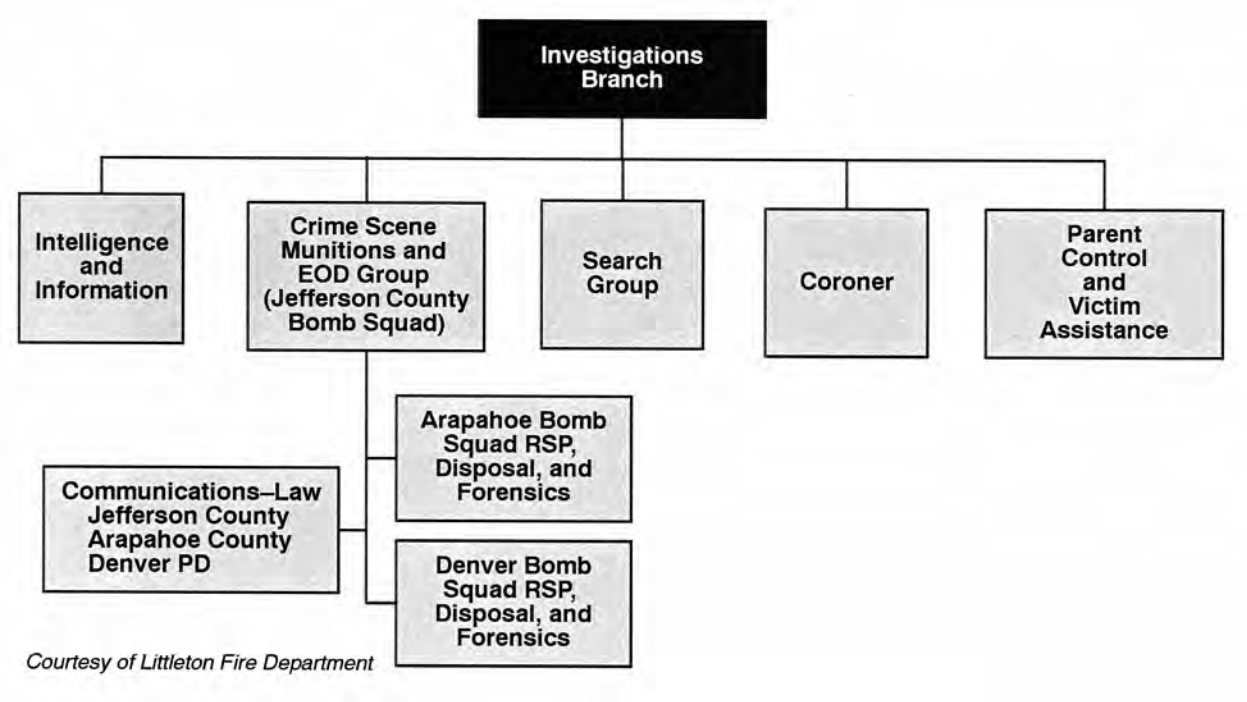


Figure 13. Organization of Investigations Branch

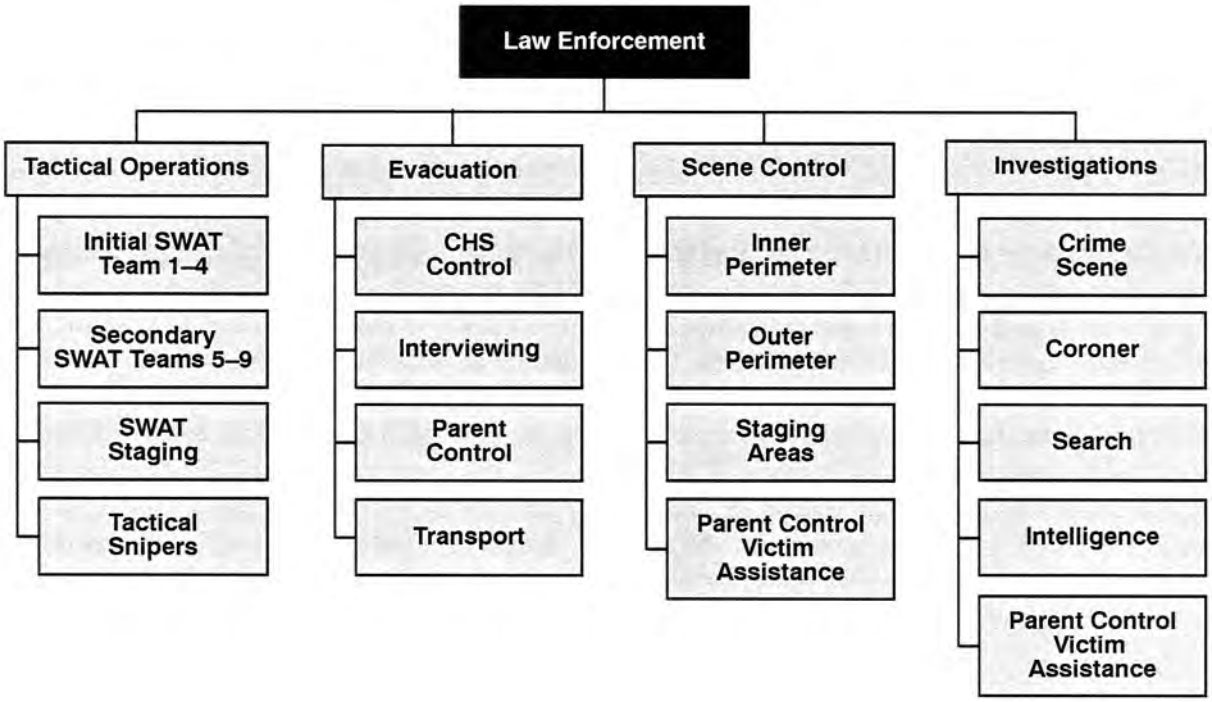


Figure 14. Organization of Law Enforcement Response

Courtesy of Corbis Sygma

Figure 15. SWAT Personnel Operating Behind the Cover of a Littleton Rescue Unit

Law enforcement personnel maintained inner and outer perimeter control of the entire area surrounding the school. They also had to restrict parental access to the school while they assisted fleeing students. Other officers were assigned to manage law enforcement staging areas or to interview and gather intelligence from students and teachers who had information vital to the incident.

At approximately 1135 hours the Arapahoe County Sheriff's Office issued a group page for members of the Arapahoe Sheriff's Office Bomb Squad to respond to Columbine High School. LFD's Deputy Fire Marshal responded and functioned as a bomb disposal technician under the command and control of the Arapahoe sheriff in accordance with preauthorized procedures. After reporting to the command post, he proceeded to Pierce and Bowles Streets and established the EOD staging area (near the Fire Department Command).

EOD Operations

The law enforcement personnel assigned to the explosive ordnance disposal (EOD) unit included certified bomb technicians and bomb technician apprentices from four agencies, listed in Table 2.

Table 2. Agencies that Provided Bomb Technicians and Apprentices

Department	Bomb Technicians	Apprentices
Jefferson County Sheriff's Office	2	3
Arapahoe County Sheriff's Office	7*	4
Denver Police Department	4	0
FBI Denver Field Office	1	0

*LFD Deputy Fire Marshal is included in this number.

All bomb squads have at least two bomb disposal suits, x-ray equipment, two disrupters, and counter-explosive charge materials. The EOD personnel brought the following resources and FBI-certified tools and equipment to the scene:

- Jefferson County Sheriff's Office: one bomb disposal vehicle (open containment vessel) on a trailer.
- Arapahoe Sheriff's Office: one bomb disposal vehicle (open containment vessel) on a trailer and transport truck and robot.
- Denver Police Department: one bomb disposal vehicle (open containment vessel) on a trailer.
- On Scene: three bomb robots of different sizes.

The arriving EOD units began to conduct render-safe procedures of the numerous devices in the building and surrounding areas. Render-safe procedures inside the school included a systematic search for explosive/incendiary devices. More than 60 devices were rendered safe for transport to a remote disposal area. Over 30 devices had either fully or partially functioned when the suspects initiated them.

At 1429 hours an EOD team responded to the residence of one of the suspects and conducted a consent search. They recovered pyrotechnic materials. Later, at approximately 1600 hours, two EOD teams entered the high school under SWAT cover to look for timed devices and to conduct render-safe procedures on exigent devices. One technician wore a full bomb disposal suit. A "fragmentation bag" was also available. The team observed various incendiary/explosive devices – some expended, others live.

Concurrently, at approximately 1600 hours, the EOD technicians initiated an automobile search and discovered two automobiles, each containing various explosive/incendiary devices. The two cars were parked in different lots at the east and south ends of the school. The EOD team identified exigent circumstances (timer-initiated devices) and initiated render-safe procedures. All EOD teams were diverted from inside the school to conduct render-safe operations on the devices in the two automobiles. Nationally recognized and accepted bomb render-safe and disposal procedures were employed to mitigate the life-safety hazard of the various explosive and incendiary devices and materials.

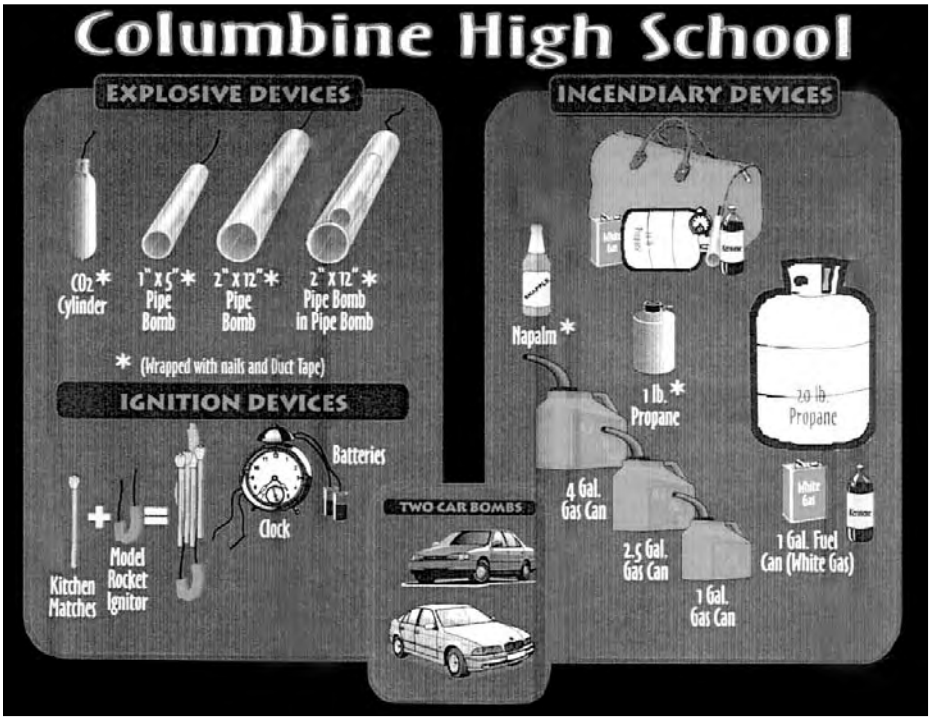
The crime scene investigation concluded that the assailants fired several hundred rounds of ammunition and used more than 90 incendiary/explosive devices, which were recovered in the investigation. Figure 16, developed by the U.S. Fire Administration, presents the type and variety of devices recovered at the site of the incident.

Mutual-Aid Response

Littleton Fire Department participates in automatic mutual aid with neighboring jurisdictions, including the West Metro, South Metro, Englewood, Sheridan, and Denver Fire Departments. They also enjoy good working relationships with several private ambulance companies, including Columbine Ambulance Company, American Medical Response (AMR), Pride Mark Ambulance Company, Rural Metro Ambulance Service , and Denver Health.

The fire, rescue, and EMS resources committed to this incident came from nearly 50 agencies representing local, State and Federal authorities. During this incident, a total of 172 command, fire, and medical personnel were used. They responded with 10 fire companies and 48 ambulances. One fire department chaplain also responded. Table 3 lists the personnel and equipment from each of these responding agencies.

During the incident, a mutual aid chief officer was assigned to the communications center for the purpose of coordinating mutual-aid responses, ensuring coverage in neighboring jurisdictions, providing moveups to various fire stations as needed, and initiating the recall of Littleton Fire Department personnel The availability of a chief officer at the communications center also provided a decision making person to facilitate and approve requests for resources, equipment, services, and expenditures.



Courtesy of U.S. Fire Administration

Figure 16. Type and Variety of Devices Recovered at Incident Site

Table 3. Fire, Rescue, and EMS Agencies that Responded to Columbine

Agency	Personnel	Units Responding
Littleton Fire Department	36	8 units, 8 command staff, 3 communications personnel and 5 off-duty personnel
West Metro Fire Department	28	7 units and 9 command staff
South Metro Fire Department	12	6 units
Englewood Fire Department	3	1 unit and 1 SWAT medic
Sheridan Fire Department	2	1 unit
Denver Fire Department	11	3 units
Columbine Ambulance Company	10	5 units
American Medical Response	30	14 units and 2 command staff
Rural Metro	6	3 units
Pride Mark	10	5 units
Fight for Life	3	1 helicopter
Airlife	3	1 helicopter
Denver Health	18	6 units, 5 command staff, and 1 doctor
Total	172	

Hospital Services

Within the immediate area of Littleton, LFD routinely used six hospitals for patient care (Figure 17). During the incident, the hospital identified in Table 4 received patients from Columbine High School. Table 4 also shows the level of trauma care the hospitals were capable of providing and their proximity to Columbine High School.

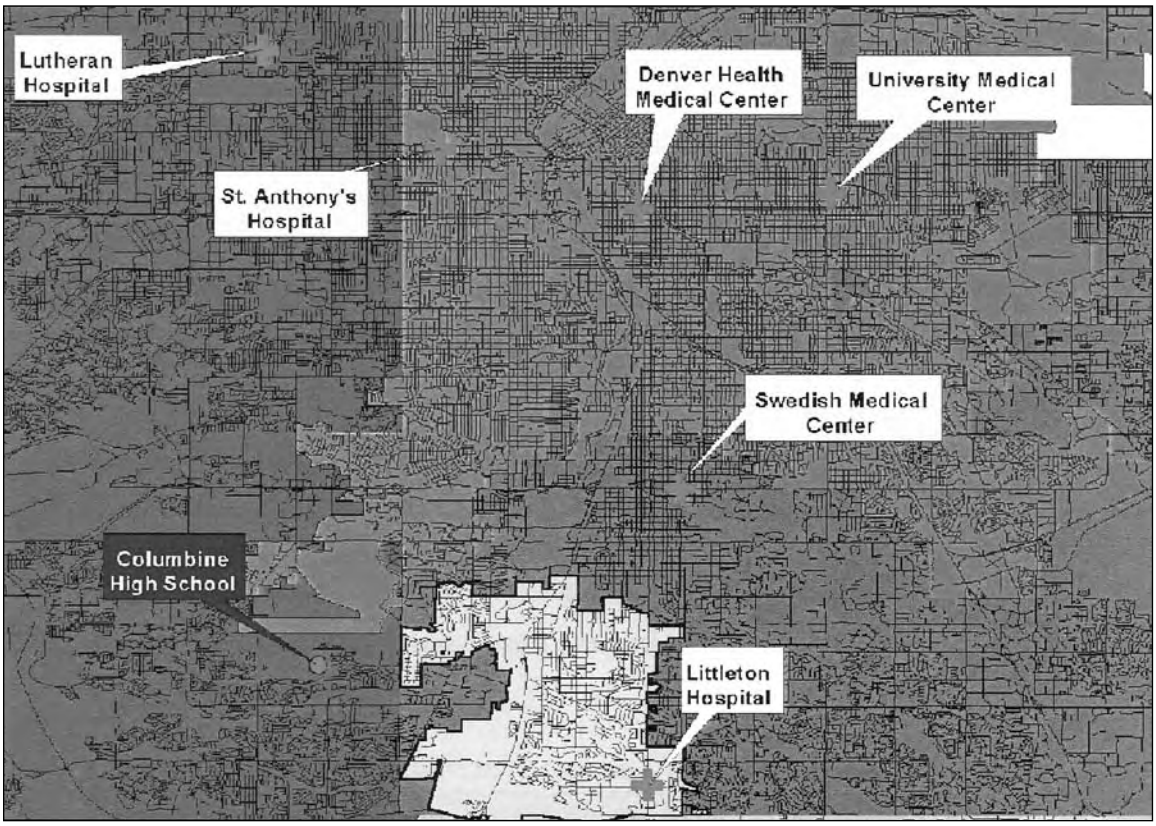


Figure 17. Location of Destination Hospitals Relative to Columbine High School

Table 4. Destination Hospitals and Patients Received

Hospital	Trauma Care	Distance to School (Air Miles)	Number of Patients
Denver Health	1	10	5
St. Anthony's	1	10	4
Swedish	2	7	7
University	2	11	1
Littleton	3	6	6
Lutheran	3	12	2

As rescue ambulances transporting victims arrived at local hospitals, they were met by trauma teams ready to provide the needed definitive care. Table 5 shows the disposition of patients upon arrival at the hospital. All the victims who were treated at Columbine and transported by EMS units (and other means) from the scene to area hospitals survived their injuries.

Table 5. Patient Disposition Upon Arrival at Hospital

Patient Disposition	Number of Patients
Critical	4
Serious	6
Fair	3
Good	2
Treat/Release	9
Total	24

OBSERVATIONS AND LESSONS LEARNED

Most jurisdictions will never encounter a situation like the one that the Littleton area responders confronted at Columbine High School. However, every community faces the possibility that an incident involving wanton violence, mass casualties, or incendiary and explosive devices may occur. Rioters, long gunmen, members of political and special interest extremist groups, and sociopathic individuals bent on revenge and domestic violence are becoming part of the modern American landscape. Indiscriminate acts of wanton violence and terrorism are occurring more frequently. As the list of such tragedies grows, so does the evidence that fire and EMS agencies need to plan non-traditional strategies and tactics, and to operate under a unified command structure when faced with such hostile incidents.

This section notes some of the more important issues associated with the emergency response at Columbine and discusses the major lessons learned from the experience. Among the many conclusions that can be drawn from this incident, the need to develop and apply exposure reduction methods beyond traditional tactics is a major finding. These preventative measures would likely include:

- Fire service/EMS use of protective antiballistic garments
- Law enforcement escorts during hostile, interior operations
- Assets dedicated to identify and to render safe potential secondary devices
- Rapid rescue and medical intervention for tactical teams
- Enhanced common interoperable communications
- Pragmatic, unified command procedures for all responding agencies.

Such measures should be considered for incorporation into multi-agency, all-risk operations plans. As a prelude to amending these plans, police, fire and EMS personnel should jointly assess the risks from more "routine" incidents, and from that experience, develop incident command systems for more complex incidents, such as the one at Columbine High School.

Joint Forces: Unified Command for Major Incidents

Protecting the public's safety is a primary mission for both the fire/EMS services and law enforcement. Historically, the line between the two has been relatively distinct: the fire service prevented and extinguished fires, and police agencies prevented crime and arrested offenders. As has occurred in law enforcement, the fire service's mission has expanded significantly over the last 25 years. Many of today's departments mitigate hazardous materials incidents, provide EMS and transport, conduct criminal investigations of incendiary fires, and manage EOD units. More recently, departments have had to begin preparing for the possibility of attacks involving weapons of mass destruction (WMD).

Joint operations and unified command between law enforcement and fire/EMS are critical to successfully manage response to incidents ranging from natural disasters to acts of terror. Some examples of such joint operations include the response to civil disturbances in St. Petersburg, Florida and the City of Los Angeles; the World Trade Center bombing; the bombing at the Murrah Building in Oklahoma City; and a series of recent, indiscriminate shootings at schools, day care centers, churches, and in other public assemblies.

The fire service has a long history of coordinating response to large-scale incidents. The incident command system (ICS) is used extensively by fire service personnel to manage major incidents by assigning special sectors to handle key response components. The five primary ICS sectors are: command, operations, planning, logistics, and finance. Local emergency management offices coordinate natural disasters through a similar system of designated branches that handle communications, requisitions and finance, planning, public information, and so forth.

At the scene of violent, multi-hazard incidents, the fire and emergency medical services usually function in a support role to law enforcement. Fire/EMS command officers need to work in conjunction with the law enforcement commander and function under one unified command. The command post should be relatively isolated and secure. Operations flow more smoothly if the jurisdictions involved have established a means for joint operations and have practiced applying the procedures. Whether that system is called unified command, joint command, or incident/standardized management probably matters less than does the fact that all public safety responders become familiar with special operational procedures during major events for which nontraditional response strategies and tactics are required. Fire and law enforcement commanders can begin planning for a joint command system based on ICS by reviewing the requirements of violent, multi hazard incidents.

In some cases, an incident may be so large and have such a broad or unexpected impact (as in bombings and riots) that incident commanders should request support form the local Emergency Operations Center. Tapping into the emergency management network facilitates the acquisition of a broad range of assets that might be needed during a protracted and complex incident. Local emergency management resources may be augmented by State and Federal resources, as well as by the private sector.

When the impact of an event meets the criteria for Federal assistance, the Federal Emergency Management Agency, at the request of State emergency management organizations, can provide a wide array of support services. Specialized assets include medical response teams (coordinated through the Department of Health and Human Services); and disaster assistance management teams that can supply communications, operations, transportation, mass care, urban search and rescue, infrastructure support, and temporary housing. Incidents where there are many fatalities may warrant the deployment of special adjunct mortuary teams. National Guard and Reserve components also can provide disaster assistance to local governments, and currently are helping to train first responders in responding to WMD events.

It would have been of great benefit if the SWAT teams, EOD technicians, and fire/EMS personnel at Columbine had been able to train in joint operations. Where joint training is especially critical is in the interface of the law enforcement teams and the EMS units. Emergency medical personnel are responsible for treating any EOD, SWAT team, or other law enforcement casualties. Generally, EMS personnel are not armed or trained in size up of a criminal scene. EMS providers also need to have rapid and safe access to civilian victims who require medical attention.

Fire Service Operations in a Dynamic, Violent Environment

Fire and EMS personnel are beginning to face dangerous multi hazard environments where wanton violence, mass casualties, and explosive devices or other hazards are present. Because these types of incidents can happen anywhere and at any time, fire service managers should plan solutions to address these emerging risks. Issues to consider may include:

- Training specialized fire department personnel (such as Hazmat technicians, paramedics, EOD personnel, or drivers) to know how the mission and tactics of special law enforcement units (such as SWAT teams or riot police) impact special fire/EMS operations. This is best accomplished through joint planning and training between law enforcement and fire and EMS services. Operational procedures should be documented and distributed to all involved personnel.
- Determining what ballistics protection the fire/EMS personnel need, given their likely assignments, and securing this equipment in sufficient quantity to ensure that all personnel who will be in harm's way have appropriate protective equipment.
- Deciding what means will be used to identify fire and EMS responders.
- Promoting policies, practices, and protocols that foster use of a common jargon by fire service and law enforcement personnel with regard to the transmission of essential messages so that miscommunications are minimized.
- Establishing a policy on whether and how to assign personnel with family members who are directly involved in the incident.
- Determining what role or authority the incident commander should grant to experts (physicians, building engineers, etc.) who are called to the scene to assist, establishing a policy for handling outside experts who exceed their authority, and ensuring that they are cognizant of the ICS structure and operations.

In situations involving terrorist-style attacks, there is a possibility that the perpetrator(s) may set booby traps. Such exigencies present a dilemma for first responders in terms of treating the wounded prior to EOD personnel giving the "all clear". This threat raises the issue of whether and how long to wait for EOD personnel to confirm that wounded civilians or perpetrators are clear of secondary devices. At Columbine, several undetonated and partially detonated devices were strewn in and around the building. Public safety officials should consider such explosion risks when they develop response plans for casualty recovery in hostile environments.

Some fire departments manage the EOD unit. If the unit employs canines, it must be remembered that they cannot work effectively in atmosphere contaminated with a myriad of explosives, gunpowder, flammable liquids, and flammable gas vapors. Moreover, K-9's do not work a scene without their handlers, and in an ongoing violent situation they cannot be used until the area is clear. Since intelligence on the presence and type(s) of explosives and incendiaries may be needed before the "all clear" can be made, robotics may be a reasonable alternative, though even these devices may be impractical if the area of surveillance is "littered" with backpacks and other belongings.

At Columbine there was a serious situation with regard to mistaken identity. A fire department officer wearing a soot-covered turnout coat was in the process of setting up a helicopter-landing zone, when a law enforcement sniper was on the lookout for a suspect with a black trench coat, and identified the officer at long range as a potential suspect. The fire officer was ordered to the ground at gunpoint before he could explain who he was. A lesson that can be taken from this episode is the ICS command vests should be available and worn by all fire and EMS commanders so that their positions are readily identifiable at the emergency incident. Moreover, fire and medical personnel may need to remove dark shirts with badges and dark turnout clothing, and wear a fire department helmet to distinguish themselves from law enforcement personnel and identify themselves to citizens.

Communications

Effective communications are one of the most important parts of any emergency response. They are absolutely critical in large-scale incidents that draw resources from a large number of agencies. However, maintaining effective communications is especially challenging during such events. Columbine was no exception to this rule.

This incident provided several examples of effective communications:

- There was good communication between transporting EMS units and the receiving hospitals. All of the patients were transported to appropriate facilities without overwhelming any individual hospital, due in part to the use of an on-scene medical control physician and a dedicated hospital coordination radio frequency.
- Dispatchers on the scene were able to assist in efforts to set up viable communications networks between sectors using a new 800 MHz radio system that was expediently placed into service at the scene.
- The 800 –MHz radios, once put into service, provided much needed communications capabilities and flexibility for this incident. These systems offer one of the best solutions to interoperability challenges.

There were also problems:

- The triage area at Yukon and Caley Streets was located in a virtual "dead zone", an area with very poor radio reception.
- The dispatch center was besieged with cellular telephone calls related to the incident.
- Responders did not receive routine updates on operations.
- There was little capability for direct police-to-fire radio communication, which became more complicated as additional units from other jurisdictions arrived on the scene.
- Not all the EMS units operating on the scene were able to use a common incident frequency since some units did not have access to FERN.
- With a few exceptions, fire EMS, and law enforcement units had only limited ability to communicate with each other during the incident. Incompatible radio frequencies and a rapid buildup of cell phone usage overwhelmed both the nearest tower and the dispatch center, thus hampering operations. Emergency service providers were frustrated by the communications challenges, the apparent lack of reliable intelligence, and infrequent operations updates.

The National Institute of Justice conducted a study to determine the technology requirements of law enforcement to handle terrorist incidents.[1] Interoperable communications technologies ranked high, and these apply to fire and EMS activities as well. Fire service units should have the ability to communicate with incoming fire units, EMS units (including aircraft), and law enforcement. EMS personnel should be able to contact medical control facilities, as well as other EMS units, fire units, and law enforcement. Encryption capabilities with handheld radios can enable secure communications of sensitive command decisions.

[1] Inventory of State and Local Law Enforcement Technology Needs to Combat Terrorism, "incident Command and Control Communications," National Institute of Justice, January 1998.

Several suggestions regarding communications can be derived from the experience at Columbine and should be considered in planning for future incidents.

- The initial on-scene SWAT commander indicated that he high levels of noise from news helicopter hampered the ability to communicate. Flyover by unauthorized aircraft can compromise security and operations. Incident command should be aware that they can establish and enforce airspace restrictions through the Federal Aviation Administration (FAA) per CFR, Title 14-Aeronautics and Space Chapter I-Part 91, Section 91.137.
- Assigning dedicated radio channels to all special-function divisions-such as EMS, EOD, SWAT, rescue, and air operations – can enhance on-scene communications.
- One of the best solutions to communication problems is to establish multiple statewide mutual-aid channels and to equip public safety responders with compatible radios. AS incidents require a Regional level response, the public safety agencies can more effectively communicate with each other. This interagency communication was done at Columbine through the CLEERS network operated by law enforcement. Another option is to operate through an 800-MHz system.
- Even at its best, communications during complex, multi-casualty incidents are likely to suffer instances of conflicting and unclear information. Also, telephone and cellular phone systems can be extremely taxed. Greater decision-making authority may need to be assigned to field crews, as was done at Columbine.

Emergency Medical Services

Littleton Fire Department EMS personnel rescued severely injured students while coming under fire from the perpetrators. Other EMS personnel triaged, treated, and transported many casualties, including over two dozen seriously injured individuals, all of whom survived. Following are some observations concerning EMS for future reference:

- Emergency response agencies should develop multi hazard (e.g., armed perpetrators and explosive devices), multiple casualty incident (MCI) plans. Such plans should designate the roles and responsibilities of assigned positions and delineate casualty collection points (CCP's) so that victims from multiple venues can be systematically collected, treated, and transported. MCI plans also should stress the importance of using incident command vests and triage tags. Joint command and interoperable communication systems are two other essential components of multi hazard, multiple-casualty planning.
- Develop an EMS supply cache system for both advanced life support (ALS) and basic life support (BLS) supplies at a local and Regional level, so that supplies can be rapidly acquired during a disaster. Supplies should be functionally grouped quantities and ready for field deployment. Many jurisdictions around the country have dedicated a trailer or vehicle strictly for mass casualty incidents. These specialty pieces often contain immobilization and bandaging supplies to treat 100 or more patients. To address emerging risks, these caches should be expanded to include the treatment of respiratory emergencies, possibly resulting from biological or chemical weapons; trauma resulting from weapons of mass destruction; and burns resulting from the detonation of explosive and incendiary devices.

- Had more explosive and incendiary devices activated, the incident could have substantially escalated and demanded significant burn care assets. If not already in place, States should work with their localities and the hospital community to establish protocols for triaging, treating, and transporting a large number of victims with burns, respiratory compromise, or exposure to hazardous materials.
- Departments should consider developing standard policy guidelines for non-departmental personnel provided access to the scene. The guidelines should cover the extent and limitations of the assignee's jurisdiction, as well as reporting protocols, responsibilities, and mission limitations, consistent with operating under a joint incident command structure.
- During a major incident, authorities should assign a medical air sector commander early in the incident to ensure that air ambulances can be requested quickly and staged at the scene (if possible), ready to conduct air evacuation of patients. Airspace restrictions should be applied if necessary.
- When Regional hospital are linked with each other and with dispatch centers, as was the case at Columbine, EMS command can remained informed of what types of patients and how many each hospital can receive, to ensure appropriate transport assignments.
- Fire and police chiefs should work together to familiarize their fire, EMS, police, and SWAT personnel with each other's operations. Operational readiness can be strengthened through joint training, coordinated procedures, and compatible equipment. Of particular importance is that fire, EMS and law enforcement personnel communicate using clear terminology that is commonly understood.

Operations

Several tactical interventions are suggested by the challenges presented at Columbine:

- Forcible entry operations, such as the use of breaching and breaking tools, may be appropriate to provide access through walls, floors, roofs, and ceilings, when typical access points are compromised by booby traps or fields of hostile gunfire.
- Commercial armored vehicles may be used to provide cover, help deploy personnel, or retrieve victims, while reducing the exposure of emergency service providers.
- Technical rescue search teams and equipment (e.g., search cams, acoustic/seismic devices) might assist personnel when they are attempting to identify or locate victims or perpetrators – especially in confined spaces and structural voids.
- Collapse rescue teams, rapid intervention teams, firefighter assist and research teams (FAST's), and backup teams may be needed in multiple casualty situations.

Additional Lessons

Several additional lessons were learned from Columbine:

- All commercial and public safety occupancies, including schools, should have a pre-fire/EMS plan, which should include a map of the exterior premises; a detailed map or schematic of the floor plan with room numbers and functions; contact numbers; fire protection system connections; locations of hazards, utility shutoffs, and alarm controls; and instructure communications systems/capabilities.

- It is important to use situation and resource tracking sheets and to communicate vital information about the situation status and the arrival of expected resources down the chain of command.
- Press areas staffed by public information officers should be established in locations that are remote from the incident command post and the operational and staging areas to avoid compromising security.
- Site control and perimeter security should be among the very first actions taken, not only to keep sightseers out, but to control and coordinate incoming units and self-dispatched volunteers. After initial first-due assignment, a staging base should be established to help ensure that the rapid influx of resources does not block either access or egress of emergency apparatus. This can be accomplished by appointing a staging officer to work with law enforcement personnel in site control. Access and egress routes, as well as staging sites, should be designated for each type of resource requested (e.g., ambulances, command officer vehicles, armored vehicles, heavy equipment). Assigned routes and staging areas should be communicated to incoming resources in advance of their arrival, if possible. A plan should be developed and implemented for removing vehicles that obstruct access, and resources should be dedicated to carry out the plan, including staging area security.
- Building inventory information (access, utility services, fire alarm, burglar alarm, etc.) should be made available on the exterior of the building (in a locked cabinet), or be provided in advance to the authorities having jurisdiction. Many fire departments use lock box building security systems to ensure access to the building and such information. For large buildings, it is a good idea to have lock boxes at each entrance.
- When planning response to large-scale incidents, the authorities should determine what procedures should be followed to deal with individuals who exceed their authority. While their intent may be good, individuals who "freelance" at emergency scenes may aggravate the risks to themselves and to others by initiating actions that could conflict with incident command decisions. During this incident, the on-scene medical director entered the school to pronounce the dead against the orders of both the law enforcement and fire commands before the scene could be secured. Furthermore, he took three LFD paramedics into the school to assist him, thus endangering their lives as well.
- Recalling personnel is expedited when command staff recall procedures are in place, which proved to be vital in getting a unified command system established at Columbine High School. Some methods that have proven effective for other fire departments include phone trees and calling lists, alphanumeric pagers, frequency-activated voice pagers, cellular telephones, and direct-connect, two-way radio feature phones.
- As a part of preplanning for major incidents, fire departments should consider developing memorandums of understanding (MOU's) with public transportation resources (buses) to initiate diversion of these assets to the scene of an emergency. It is important that the MOU's establish priority of assignment so that other jurisdictions are not keying on the same public transit vehicles.
- In escalating emergency incidents, a planning sector officer should be assigned. The role may differ among jurisdictions but should include documenting the situation and tracking resources, conducting planning meetings, providing incident maps, and developing a demobilization plan.

Technologies that Enhance Response

The lessons from Columbine cover a multitude of important issues for the fire service leaders to consider as they preplan joint command structures for potential criminal incidents with mass casualties. Some of the solutions relate to technology and how technological tools might have helped to mitigate the impact of and the problems associated with the massacre. Four technology areas deserve to be discussed:

- Surveillance and security
- Command, control, and communications (C^3)
- Detecting, disabling, and containing explosive devices
- Intelligence

Surveillance and Security

Surveillance technology is an important tool for law enforcement, EOD personnel, and fire/rescue units. In the Columbine assault, many of the law enforcement and SWAT members who had to gain access to the inside of the school had only handwritten maps on which to rely as they negotiated their way into the hostile environment. Technology that literally allows officers to see through interior and exterior walls would have been invaluable in locating the assailants and the victims. The capability to see through walls remotely (at least 100 feet away) allows operations personnel to remain at a relatively safe distance from the violence. This technology allows one person to perform the surveillance and simultaneously transmit real-time images to the command post.

Other technology that applies to Columbine is the capability to identify explosive and incendiary devices. Not only did authorities have a hard time locating and tracking the suspects inside the building, but they also were challenged to locate the dozens of explosive and incendiary devices throughout the school.

Audio surveillance equipment, which allows officers to listen to conversations and activities within targeted areas from the safety of a secure area, would have aided in tracking the assailants. With audio surveillance capabilities, authorities may have been able to listen to the suspects' conversations or to secure intelligence from others inside the building. They would have had a means for hearing the cries of wounded students and for locating their positions inside the school. Digital photography was used at Columbine to brief investigative teams about the complexity and severity of the scene and to show incident command staff actual pictures of devices that the EOD team was having to render safe before other activities could take place. Some of the digital images were obtained through the use of an EOD robot.

The National Institute of Justice published a research report on security technologies for schools.[2] The Bureau of Justice Assistance, in collaboration with the International Association of Chiefs of Police, produced a valuable guide on school violence.[3]

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[2] *The Appropriate and Effective Use of Security Technologies in U.S. Schools*, National Institute of Justice, September 1999 (NCJ-178265).

[3] *Guide for Preventing and Responding to School Violence,* Bureau of Justice Assistance and the Security Research Center of the Department of Defense, International Association of Chiefs of Police, November, 1999.

Command, Control and Communications

Interagency communications are essential in any incident involving multiple agencies. The Columbine incident drew roughly 170 fire and EMS, and nearly 1,000 law enforcement personnel. Communications in such situations can easily become compromised and are, by nature, complex. It is essential that the incident commander have the ability to simultaneously broadcast to all participating agencies. In addition, the incident commander should have a management information system that can provide real-time data to track units and resources. An integrated mapping capability with the ability to superimpose unit locations is especially useful in incidents where many agencies are involved. A sophisticated management information system that allows the incident commander to track resources makes it easier to monitor ongoing operations and to discern what contingency resources are needed.

During an event of this magnitude, the incident command post needs sophisticated communications capabilities, including long-range digital radios (with encryption capability if necessary), secure faxes, photo faxes, and PC incident software. Such C^3 technologies, when employed, facilitate interoperability among various agencies and allow the incident commander to control the scene in a more coordinated and efficient manner.

As valuable as the emerging C^3 technologies are, most jurisdictions currently consider such equipment to be unaffordable. However, the Naval Research Laboratory has supported the development of crisis communications technology in a light tactical operations center called the joint combat information terminal (JCIT). Significant design emphasis has been placed on ensuring its ability to support horizontal technology insertion. The advanced digital and RF technology provides unprecedented connectivity and tactical information processing in a compact, modular, reconfigurable, open system architecture. Currently the New York City Emergency Preparedness Office, the Alexandria, Virginia Police Department, and the Chicago Fire Department are testing applications for civilian use.

Detection, Disablement, and Containment of Explosive Devices

The scene inside Columbine High was extremely hazardous to responding emergency personnel. Not only did the suspects have an array of weapons, including semiautomatic rifles, hand guns, and shotguns, but they also dispersed improvised incendiary and explosives devices that were imperfect, and therefore very unpredictable.

The technology currently exists to employ robots with explosive ordnance disablement (EOD) capability. They can climb stairs and, in some cases, manipulate packages weighing up to 100 pounds. They have a remote viewing capability and can transmit real-time video to a command post. This technology was available at Columbine and proved to be extremely useful given the number of explosive devices. A robot with an EOD capability was used for render-safe operations on the two cars.

Intelligence

Intelligence provides the incident commander and first responders with pertinent data about an incident and assists them in making informed decisions. When responding units first arrived on the scene at the Columbine assault, they had little definitive intelligence upon which to rely. They did receive reports of possible multiple gunmen inside the building. Unfortunately, they had no way of knowing exactly how many perpetrators were involved, nor what type of arsenal they possessed. First responders had only basic information on the layout of the school and conflicting information on the suspects themselves. The prefire plans that some fire units did have were out of date. Had the aforementioned surveillance and detection technologies been available, intelligence from inside the building could have been gathered. The lack of intelligence data was exacerbated by the length of time it took to disseminate incoming information to personnel in the field. Maintaining an effective method to communicate intelligence data (location of suspects, background data on the suspects, number of suspects, appearance, etc.) to operations personnel is essential during chaotic and intense situations such as the Columbine incident.

AFTERMATH

Littleton, the surrounding jurisdictions, and the entire nation grieved after the tragic assault at Columbine High School. Soon after the incident, a makeshift shrine consisting of flowers, pictures, letters, and stuffed animals began at the school grounds and eventually extended to the adjoining public park, serving as a constant reminder of the tragedy for the citizens of the area and the Nation (Figure 18). Members of the fire and emergency service community were especially affected, both by the trauma of the immediate loss and the realization of the implications for the future.

Figure 18. Mourning the Loss

Following any major fire/rescue (and law enforcement) incident, there is an immediate need for affected personnel to have an outlet for understanding and processing their reactions to the event. Critical incident stress debriefing (CISD) is an important undertaking for the health and welfare of involved personnel. CISD not only gives the agency leadership the opportunity to discuss the operational aspects of the response but, more importantly, provides a forum where the department members can express their concerns and feelings about the incident and address their pain.

Terrorist-type incidents such as the one at Columbine *by design* tax the physical and emotional resources of even the most experienced and tenured rescuers. The Littleton Fire Department pursued numerous avenues designed to help the department as a whole and its members individually to heal from this tragedy.

This report focuses on the recovery activities of the Littleton Fire Department. Many other firefighters, paramedics, and law enforcement personnel from the Denver region responded on the call or filled in as mutual-aid companies. The post-incident recovery of these other personnel was not within the scope of this report.

The officers of the Littleton Fire Department deemed it their first priority "to attend to our own" and considered it appropriate and prudent that each department independently address the needs of its own personnel, rather than conduct large-scale, multi-organizational debriefings. In an attempt to make the debriefing sessions as beneficial as possible, the Littleton Chiefs thought that each department responding to Columbine should arrange and conduct its own (relatively smaller group) critical incident stress debriefing sessions.

During the incident, on-scene CISD was made available. Around 1700 hours, A-shift personnel began to be relieved of duty. Some of the firefighters initially resisted being sent home, wanting instead to see the shift through to its conclusion. However, it was later generally acknowledged that "standing down" was the right command decision for a number of reasons. Many personnel were physically and emotionally exhausted, and their families and friends needed reassurance about the welfare of A-shift personnel.

The Littleton Fire Chief, in retrospect, reported that before personnel are released from duty after a major incident, the department should make sure that the individuals will not be alone. Some personnel may wish to stay at the station and seek support in group activities; others may not have the friends or relatives who are immediately available to offer support. These personnel may prefer to stay at the station where they can find others to talk to and help them "decompress". Such challenges should be expected, and the command cadre should maximize opportunities to address such needs through innovative peer support and counseling services, as appropriate.

Department personnel should also be alert to members "distancing themselves" from the group. Individuals who seem unusually quiet or withdrawn may be experiencing difficulty addressing and resolving their emotional reactions to the stress and trauma of the incident.

Such individuals may require special support. The challenges associated with the department's operational and emotional recovery may place unprecedented demands on the command staff of the department as well.

A return to standard operational readiness will likely be achieved in short order, but the organization's psychological recovery (return to normalcy) may be a protracted and complex process, drawing heavily on the strength and skills of the command staff. These personnel, in turn, may require train-

ing in grief counseling techniques and special leadership-focused stress debriefings and support.

The day after the tragedy, Wednesday, April 21, the department conducted an initial debriefing for personnel who responded to the incident. However, the counselor conducting the debriefing was too inexperienced to address the complexities of such a large-scale terrorist-type event and the attendant emotional trauma. These first formal counseling sessions did not go well, and many of the firefighters needed extra encouragement from senior officers to attend the debriefing sessions that followed.

One-on-one CISD support began five days after the initial group sessions. Following standard guidance on how to handle debriefings, the department worked with the staff in separate groups. For example, A-shift personnel were split into those who were directly involved and those who were not directly involved. B-shift, C-shift, and spouses formed three other groups. Except for the spouses, each group was scheduled for a debriefing with the chiefs and counselors and a walkthrough of the high school. Each group conducted critiques as well. While there is value in approaching the task in this manner, the Littleton Fire Department encountered a few problems.

The main disadvantage to creating these discrete groups was that, for the personnel who had not been on duty that day, or who had worked the incident from a remote location, the separate CISD sessions underscored the difference between those who were actively part of the emergency and those who were not. This sensitivity was later addressed by ensuring that all shifts had an opportunity to walk through the high school and participate in a general meeting with the chief officers of the department.

It also is important to gauge the effectiveness of the CISD sessions. This incident happened on A-shift, so those personnel needed immediate attention to address their emotional concerns. However, it is important to determine how the others shifts could be involved in post-incident stress interventions. B-shift relieved their A-shift colleagues and undoubtedly were affected by their outward stress and grieving. A balance should be sought in determining when to conduct and who to include in the debriefing sessions.

A 24-hour fire department shift schedule usually creates close interdepartmental relationships. Shift colleagues are the ones with whom personnel are likely to be most comfortable in expressing their emotions about the incident. Chief officers should recognize this dynamic and be attentive to maintaining the most suitable atmosphere for personnel to resolve their feelings. However, as Littleton leadership discovered, it is important not to create separatism among the staff. Senior fire officers should consider the respective benefits of mandatory debriefing sessions versus voluntary sessions in order to provide the most possible assistance for personnel. Every incident and the subsequent impact on personnel is different and uniquely complex. Direct communication with personnel will help to guide the chiefs as they pursue the best program.

The CISD process for the Littleton Fire Department encompassed days for some personnel while weeks and months were needed for others. Their experience shows that each person's needs may be different. As a direct result of this incident, for example, one staff member needed time away from the job. The department accommodated the staff member's needs, and the individual later returned to work. The fire department demonstrated its commitment to staff well being through supportive policies and programs for all its personnel as they sought to manage the stress resulting from the incident and the return to normal routines.

POST-INCIDENT EVENTS

On Sunday, April 25, 1999, 5 days after the massacre at Columbine High School, a memorial service was held to honor the deceased as well as the injured. While still dealing with the emotions from the incident, the Littleton Fire Department had secured coverage for the memorial service and for maintaining coverage in their response area. Eighteen teams of two medics each were deployed on bikes throughout the grounds of the memorial service. A number of golf carts were also used. Two tents and a fixed facility were equipped and staffed for medical emergencies. Three ambulances were available on the grounds for immediate transport, six more were in staging, and a helicopter was on standby. The South Metro Fire Department backfilled the Littleton Fire Station to ensure that fire protection remained intact for the citizens of Littleton. Approximately 35 paramedics from neighboring departments helped to provide medical coverage for the service. By day's end, there had been only a few calls for assistance. Over 70,000 people, including the Vice President, attended the service.

The community memorial service provided not only an environment in which family and friends could grieve, but also an opportunity for the Littleton firefighters and paramedics to acknowledge their emotions. Twenty-two member of Littleton's A-shift who responded to Columbine were seated together at the service and were recognized by speakers during the program. The outpouring of gratitude and compliments to all the public safety personnel who were involved helped ease their pain. However emotional trauma from an incident as significant as Columbine can not be erased by any single memorial service, counseling session, or critique. Responders must confront the issue not only as a team but also individually.

Two of the medics who transported a patient with gunshot wounds continued to visit her in the hospital until her release. Since some of the victims were paralyzed from the shootings, major lifestyle changes and renovations to their homes were necessary to facilitate a degree of independence. Littleton firefighters volunteered their time and effort to help with such renovations. Becoming actively involved in the victims' recovery helped the firefighters with their own. The need to do something positive in response to tragedy contributes to the recovery process. Most people perform individual acts of kindness, or contribute in ways that generally go unnoticed. However, in the aftermath of this incident, one such effort was a group initiative that literally touched thousands. A number of Littleton firefighters collected the flowers that had been left at the impromptu memorial site near the high school. They dried the flowers in a hose drier at the station, packaged them as potpourri with ribbons in Columbine's blue and white colors, and distributed the unique remembrances throughout the community.

Equally important as the formal CISD program in helping the responders cope with the aftermath of the incident was the peer support (such as that noted above) that was provided. The department held an internal awards ceremony where medals of valor, medals of distinction, and other recognition were awarded. Some of the department personnel have also been recognized at both the State and National level.

Overall, the department undertook a variety of means to assist personnel in their recovery from the shock and aftermath of Columbine. Time off was authorized as needed. The community's support was acknowledged and made available. If it is indeed possible to bring closure to such a horrific incident, the memorial service, the counseling, and the awards ceremony helped the Littleton Fire Department and the community begin the process of healing.

CONCLUSION

The wanton violence inflicted on the students and staff of Columbine High School, their families, the citizenry at large, and the members of the emergency services community who responded to the incident was a tragedy that no one could foresee. The senseless pain and loss visited upon all who were affected did not end with the close of the incident, the care provided the injured, the funerals for the victims, the poignant memorials, or the reopening of the school the following year. The impact of Columbine will be felt for a very long time.

Unfortunately, such violent incidents perpetrated against young, innocent victims have become all too frequent. "It can't happen here" *is* happening here, and the emergency service providers who may next be called must be prepared for that possibility.

The Columbine incident, and similar acts of wanton violence, create a new dimension for emergency service provider roles and functions. Such events challenge the conventional strategies and tactics of fire and rescue agencies that normally operate with relative independence. Beyond the normal hazards experienced at fire/EMS incidents, large-scale, violent incidents present additional and unfamiliar risks to first responders. Generally, most fire/EMS agencies defer their direct involvement in hostile incident operations until law enforcement personnel can "secure" the area. In this incident, fire service and EMS providers were subjected to hostile and gunfire while retrieving seriously injured victims. In addition, undetonated incendiary and explosive devices were not discovered until personnel had been exposed to substantial risk. Such are the realities of the expanding operational environment of emergency service providers to terrorist-type emergencies.

Concurrent police, fire and EMS tactical operations necessitate joint incident command structures, robust interoperable communications capabilities, standardized operational practices, and multi-agency exercises to promote and achieve an effective response. These lessons were not first learned at Columbine; they were, however, dramatically reinforced.

APPENDICES

A. Littleton Fire Department Area Response Map

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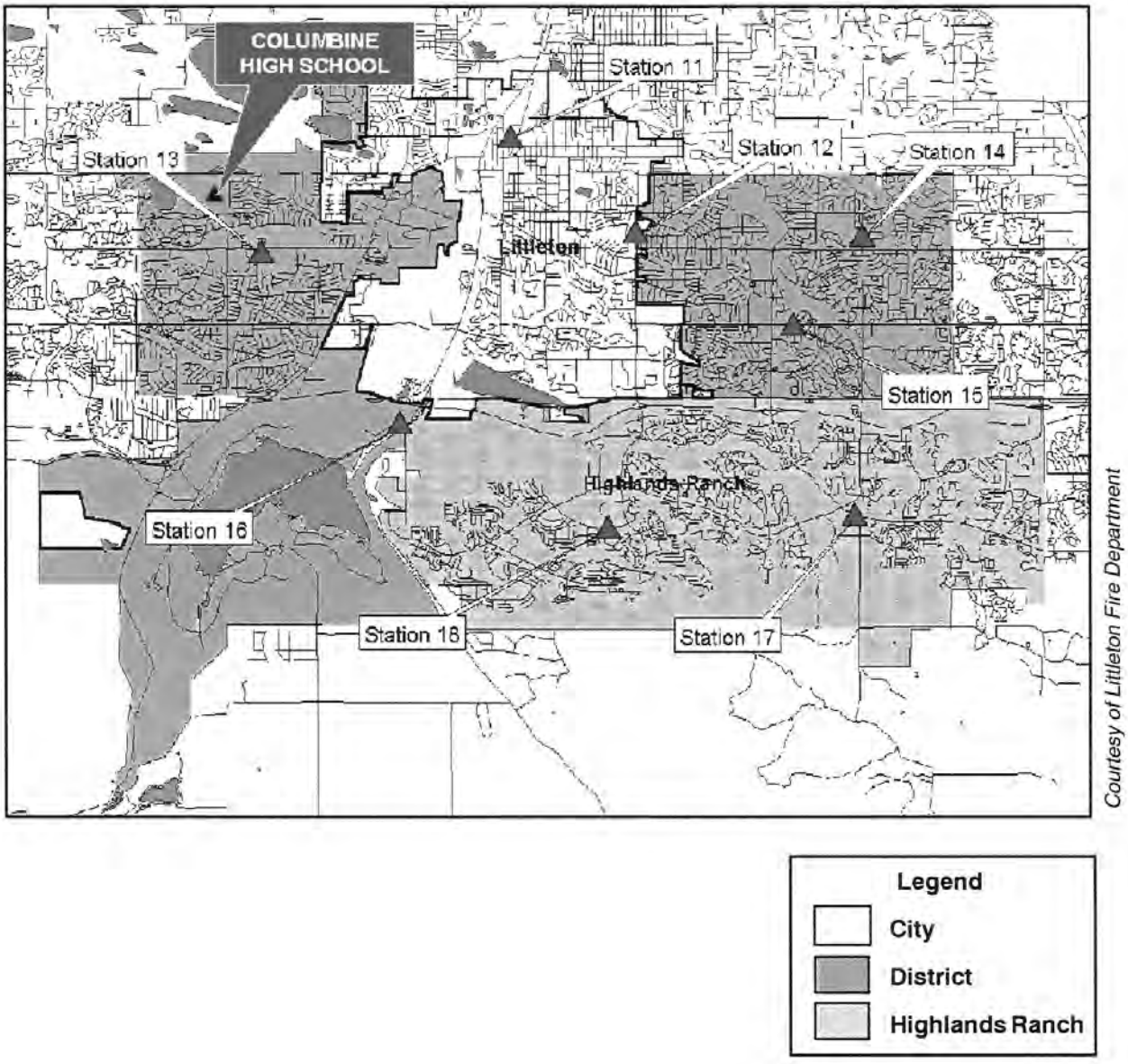
APPENDIX A

Littleton Fire Department
Area Response Map

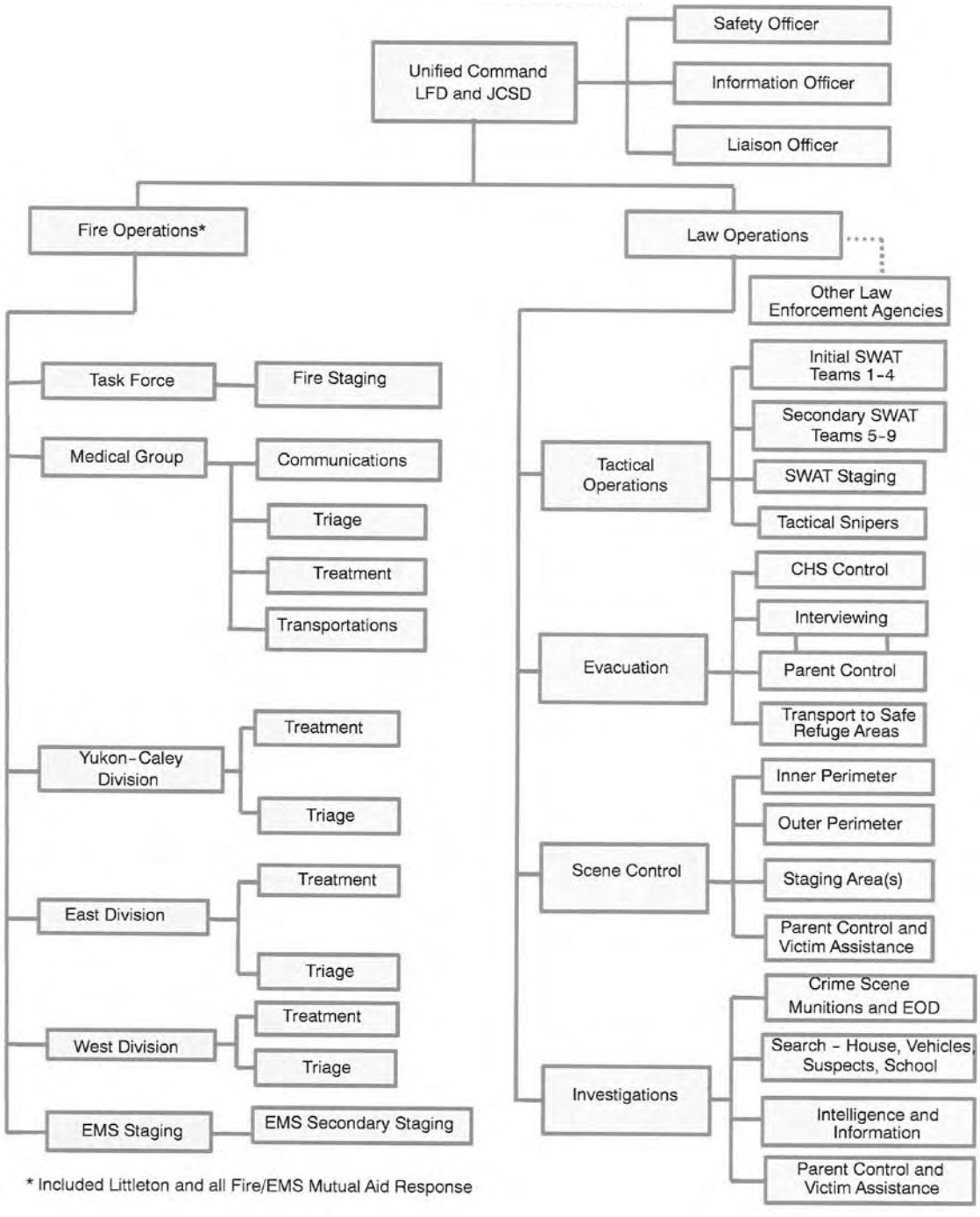


Courtesy of Littleton Fire Department

APPENDIX B

Unified Incident Command Chart

Unified Incident Command Chart



APPENDIX C

Columbine High School
Incident Timeline

Columbine High School, Littleton, Colorado
EMS Timeline

April 20, 1999

1115	Littleton Engine 13 is dispatched for explosion/brush fire at Chatfield and Wadsworth Streets. Device was diversionary explosive previously planted by suspects.
1119	Shootings and explosions begin at Columbine High. School's fire alarm is sounding.
1130	Littleton Engine 11, Rescues 11 and 13, and Battalion Chief 1 are dispatched to Columbine High.
1133	R13 requests two more ambulances to staging; E11 requests that medical helicopter be placed on standby.
1137	R13 arrives at staging area (Weaver and Pierce Streets); Jefferson County Police enter south parking lot.
1138	BC1 arrives on scene and assumes command at Pierce and Fair Streets. Alternative fire ground channel requested and Pierce Street ordered closed. One victim is down outside. E11's officer detains athletes to assist in containing students and separating students from possible shooters and injured and uninjured.
1140	Comm Center broadcasts warnings that suspects may be wearing long, black trench coats. There are reports of victims with head, face and spinal injuries. E11's officer orders LFD personnel to remove dark blue uniform shirt and badge, reverting to their standard-issue gray T-shirts to differentiate themselves from police.
1140	West Metro Fire Department is on the air, moving into proximity of Littleton Fire District in anticipation of Littleton calling for mutual aid.
1143	Units advised that there were explosives in cafeteria, in addition to more than one suspect.
1145	BC1 requests assistance from Jefferson County Sheriff's Office in setting up unified command post. R11 sent to Fair and Pierce Streets for a victim with gunshot wound to leg. R11 transports patient to Jay and Bowles Streets where patient is transferred to Columbine Ambulance 5.
1146	Command staff call out.
1146	Chief 11 arrives on scene. Command post is set up at Pierce and Leawood Streets.
1152	Sprinkler system is activated in cafeteria. Off-duty battalion chief is called in to recall off-duty personnel.
1155	First patient is transported to Littleton Hospital by Columbine Ambulance 5.
1157	R11 and R13 are requested by SWAT officers to response to southwest parking lot for report of multiple victims down. R11 and R13 are advised that scene is secure to proceed; SWAT team is "covering" the paramedics with their guns aimed on the second floor of the library.
1158	C1 establishes unified command with law enforcement.
1159	Chief 1 (Littleton Fire Chief) is responding with assistant fire marshal and paramedic captain.
1202	Command authorizes E11 to be transferred to law enforcement to be used for cover as they approach school. Windows of engine are covered with body armor, a SWAT team member is given a crash course on the operation of the vehicle, and all medical equipment is removed from engine by LFD members.
1202 to 1205	R11 and R13 report they are "taking gunfire." The police provide cover for them. Three patients are rescued from area; a fourth victim is obviously dead.
1203	Jefferson County Sheriffs are transporting students from school to south end of Clement Park. Several ambulances are requested by Jefferson County Sheriffs; West Metro Fire Department engine and ambulance respond to call from their staged location.
1204	Command requests that as many ambulances as possible stage at intersection of Pierce and Leawood.
1206	R13 stops at command post and transfers one critical patient to Denver Health ambulance, which transports victim to Denver General Hospital. R13 and R11 transport other patients to Swedish Medical Center.
1208	Littleton Fire Stations are backfilled by mutual-aid companies.
1210	Yukon/Caley Triage Division/Sector is established. R18 establishes command of sector. Communication via radio is limited. R18 is unable to contact Triage Sector for hospital assignment via the trauma-net hospital radio link.

Columbine High School, Littleton, Colorado
EMS Timeline

April 20, 1999

1211	Shots are still being fired in and around school area.
1212	Littleton Training Chief 10 coordinates landing of medical helicopter east of Clement Park. Police sniper mistakes Chief 10 for the gunmen and receives authorization by law command to shoot. Police approach C10 with weapons drawn, take him to the ground, and then realize his identity.
1213	Denver Truck 10 requests ambulance to middle of park; there is one patient on golf cart with gunshot wound. American Medical Response handles request.
1218	Yukon/Caley Division requests 10 ambulances to assist with 11 patients – four critical, four serious, and three stable patients – all students. One patient from Yukon/Caley is airlifted with gunshot wound to the head. Many wounded students are transported to Yukon/Caley in police cruisers.
1219	E13 is dispatched to assist at Yukon/Caley and arrives at 1222.
1219	Medical supplies are being shuttled from Station 13 to Yukon/Caley by off-duty LFD captain.
1219 to 1223	Additional units arrive: West Metro Ambulances 10,12 and 13; Pride Mark Ambulance 106; and Rescue 101. Secondary staging established at Bowles and Pierce.
1225	R18 transports student from Yukon/Caley with open chest wound to University Hospital.
1227	West Metro Ambulance 12 transports one patient to St. Anthony's.
1228	Columbine Ambulance 7 transports one patient to Denver General Hospital.
1228	South Metro Chief arrives at Littleton Communication Center to direct operations for resource deployment.
1232	Off-duty Littleton firefighters/paramedics are called in to assist with station coverage.
1240	West Metro Ambulance 13 transports one patient to Littleton Hospital.
1241	IC requests second fire ground channel and a dispatcher from Littleton Communication Center. New 800-MHz portables are placed in-service to link command sectors.
1242	Fire Task Force is established to provide fire suppression/ventilation in the event of a fire developing (Littleton and West Metro Fire Departments). E16's officer is in command of task force. Task force stages at Pierce and Coal Mine; access to school would be through the main entrance.
1244	EMS units switched to Fire Emergency Response Network. Switching to this channel allowed mutual-aid companies and Littleton companies to all operate on the same frequency. Even still, not all mutual-aid companies had access to FERN.
1246	All ambulances currently not in staging are instructed by command to stand by at Bowles and Wadsworth.
1252	Parents are advised that uninjured students could be met and released at Leawood Elementary School.
1256	Command requests FAA to clear airspace above school and Clement Park of news helicopters.
1258	Command requests spare radio batteries for on-scene portables and an update on the hospitals.
1311	Yukon/Caley sector reports that all patients have been transported.
1314	Red Cross representatives are en route to scene. LFD acquires bottled water from local stores to hydrate on-scene personnel.
1321	Yukon/Caley sector requests additional supplies in anticipation of more patients.
1329	Jefferson County communication Center reports eight students and a teacher are injured inside the school.
1334	East Triage Division is established by R13 to treat victims as they are removed from the structure. A suspicious backpack is found in their path, inside the east entrance. R13 is warned of the possibility of encountering motion-sensitive detonators.
1342	Jefferson County Communication Center reports that all students must be treated as suspects as the shooters may have changed clothes and could be trying to leave with the other students.

Columbine High School, Littleton, Colorado
EMS Timeline

April 20, 1999

1356	Command requests refueling services be dispatched to the scene.
1358	EMS units are dispatched to Leawood Elementary for a report of a heart attack.
1428	There are reports of multiple patients inside the school.
1429	E17, R18, and bomb squad are dispatched to one suspect's home for a reported natural gas leak.
1440	R18 reports live explosives found at suspect's home. Water supply is established, and radio use is suspended on-scene until area is secured by bomb technicians.
1455	South Metro R37 arrives with replacement batteries for portables.
1457	West Triage Division is established with LFD captain assuming command of sector. Denver Health A12, West Metro A15, and South Metro R35 are used to support SWAT operations and triage/treat victims in and around school library.
1525	LFD captain on the scene at suspect's home orders evacuation of surrounding homes.
1534	There are reports of more than 20 people injured in school. Other reports were also received indicating three officers and two suspects down in school. Officer-down reports proved unfounded.
1537	EMS personnel from throughout Colorado call communication centers and begin arriving on-scene to assist after hearing broadcasts of "all come" on radio and TV.
1541	Wounded teacher is found in library.
1543	There is a report of a possible gas leak in school ceramics room.
1544	There is a report of no other survivors.
1604	LFD personnel are cleared by law enforcement/SWAT teams to enter building and shut off school's fire alarm and main sprinkler valve.
1612	Command orders that off-duty battalion chief and B-shift personnel be brought into relieve A-shift personnel to enable them to return to their families.
1635	Reports of shots fired in gymnasium force command officials to restrict utility companies from accessing rear of structure to shut gas off to building.
1645	Denver Health physician and paramedics enter school to pronounce the dead.
1647	Yukon/Caley Division is dissolved.
1653	Mutual-aid ambulances are placed in-service by command.
1711	CISM team is requested for defusing/debriefing scheduled for 1830.
1716	B-shift personnel are called in to staff units. Training chief, E11 and R11 are deployed to northwest section of school to detonate bombs found in and around the school.
1801	Member of SWAT team is transported to hospital for dehydration.
1836	Denver International Airport light trucks are called by Denver police to assist on the scene at Columbine.
1913	LFD Heavy Rescue 14 is repositioned on west side of school for lighting.
1934	C1 arrives at Denver Health for press conference.
2004	A-shift personnel are relieved from duty by B-shift personnel.
2123	All mutual- aid units are released to return to their districts.
2131	All crew changes are completed.
2240	Bomb detonates while being transferred to bomb disposal unit; one technician needs to be assessed for injuries.
2242	Southwest parking lot is declared an unsecured area; all fire/EMS personnel are advised to remain clear of area.
2353	All operations are turned over to LFD Training Chief 10 for bomb disposal.

APPENDIX D

Abbreviations and Acronyms

ALS	advanced life support
AMR	American Medical Response
BLS	basic life support
C^3	command, control and communications
CCP	casualty collection point
CFR	Code of Federal Regulation
CHS	Columbine High School
CISD	critical incident stress debriefing
CISM	critical incident stress management
CLEER(S)	Colorado Law Enforcement Radio (System)
EMS	emergency medical services
EMT	emergency medical technician
EOC	emergency operations center
EOD	explosive ordinance disposal, explosive ordnance disablement
FAA	Federal Aviation Administration
FAST	firefighter assist and search team
FBI	Federal Bureau of Investigation
FERN	Fire Emergency Radio Network (State of Colorado)
FM	fire marshal
Hazmat	hazardous materials
HEAR	Hospital Emergency Administrative Radio (State of Colorado)
IC	incident commander
ICS	incident command system
IED	improvised explosive device
JCIT	joint combat information terminal

JCSD	Jefferson County Sheriff's Department
LFD	Littleton Fire Department
LPD	Littleton Police Department
MCI	mass casualty incident
MHz	megahertz
MOU	memorandum of understanding
MPDS	Medical Priority Dispatch System
PD	police department
PIO	public information officer
RSP	render-safe procedures
SWAT	specialized weapons and tactics
VHF	very high frequency
WMD	weapons of mass destruction